

AUTOMOTIVE INDUSTRIES

The AUTOMOBILE

Vol. XLVII
Number 23

PUBLISHED WEEKLY AT 239 WEST 39th STREET
NEW YORK, DECEMBER 7, 1922

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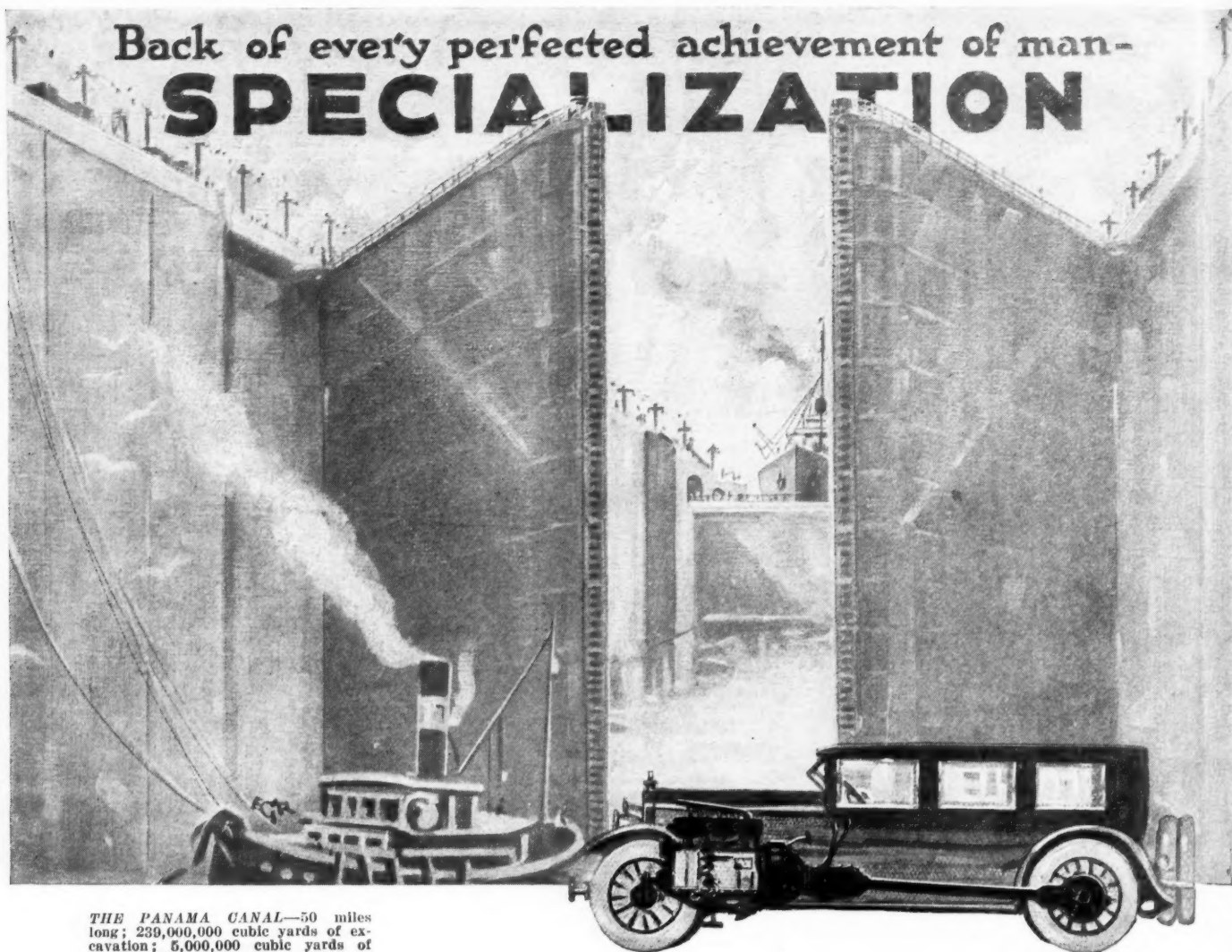
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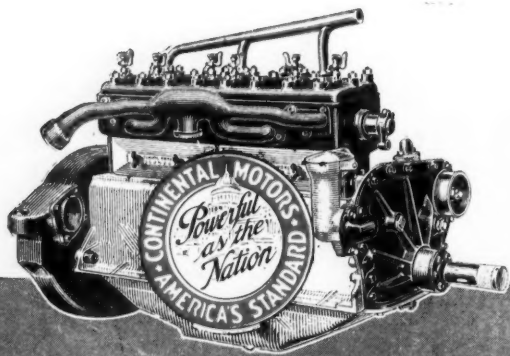
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AUTOMOTIVE INDUSTRIES

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NEW YORK—THURSDAY, DECEMBER 7, 1922

No. 23

Motor Vehicle Users Pay Bigger Tax Bill Than Railroads

Special levies against them in 1921 aggregated \$341,000,000 while state and federal imposts on carriers amounted to only \$276,500,000. Railroad plaint about onerous burden for highway building not well founded. Automotive freight bill heavy.

By James Dalton

MUCH ado has been made by the railroads of the country over their contention that they are being taxed heavily to provide for the construction of highways over which motor vehicles operate, free of charge, in competition with them.

This assertion has been made so often, and the propaganda campaign back of it has been conducted so skillfully that it is generally accepted as true, even by a good many motorists.

All such allegations are based on false premises. These are the facts:

The railroads of the country paid in 1921 approximately \$276,000,000 in state and federal taxes. The major part of this impost was levied in the form of corporation income taxes.

The motor vehicle users of the country, in the same period, paid a total of approximately \$341,000,000 in the form of special levies alone, such as registration fees, excise, gasoline, municipal and other levies. If an estimated \$75,000,000 for personal property taxes is deducted, the automotive user still paid approximately \$266,000,000 in special levies.

Corporation income taxes and all other general levies were paid by automotive manufacturers last

year in addition to the other burdens. They logically should be included in the user's bill, because all these items finally are passed on to the consumer just as the carriers' taxes are reflected in the cost of rail transportation.

Disregarding, however, the corporation taxes paid by the automotive industry on an output with a wholesale value of \$2,212,000,000, the total taxes of railroads amounted to only \$10,500,000 more than the special levies alone on users of motor vehicles.

The total rural highway bill for 1921 approximated \$700,000,000, although the final compilation has not been prepared by the Bureau of Public Roads. It thus appears that after deducting the item of \$75,000,000 paid in personal property taxes by automotive users, their \$266,000,000 in special tax levies paid at least one-third of the nation's highway bill last year.

IT should be understood, in addition that the \$700,000,000 estimated for rural highway construction was not an annual charge against the taxpayer. A very large percentage of this total went into construction. This percentage is a capital charge which should properly be assessed over a period of years. The total of bond issues now outstanding against highway building is estimated at \$367,687,000. This

sum is being directed into annual construction outlays and a very large proportion of the total cost of amortization and interest is being paid from motor vehicle fees.

It is apparent from these figures that any attempt to allocate to the automotive user only that part of the whole which he is paying in the form of state registration fees is entirely unfair.

IF the expenditures for municipal streets were to be included in the annual road budget of the nation, the total yearly expenditure probably would run well over \$1,000,000,000. In any financial analysis, however, this amount can be largely set aside, as accepted municipal street development practice assesses the initial costs against abutting property and is a general charge common to all and profitable to all.

In many cases railroad construction in this country was stimulated through land grant subsidies. These subsidies are held to be justified by the enormous increases in land valuations which they made possible. An exact analogy to this situation is found in the case of highway development. Actual surveys made by the Bureau of Public Roads demonstrate beyond question that increases in valuation resultant from highway development range anywhere from 300 to 1000 per cent, depending upon the accessibility of the land.

While first and continued charges of railroad construction, maintenance and operation are lodged against the railroad, the railroad enjoys the sole right to the use of its property and exacts a compensation therefor. The motor vehicle enjoys no special privilege of this character as the highways are open to all alike.

In the last analysis, however, it is the taxpayer who pays the bill, whether it be for highway or railway construction and transportation. In the one case, it is true, he pays in the form of special levies or taxes, while in the other he pays a passenger or freight bill. But in either case, the taxpayer, who is the public, pays for the service and it is the public which must finally determine in what form and how he shall meet his transportation needs.

In any consideration of taxes there is one other point which should not be forgotten. That is that the automotive industry pays a very large part of the railroads' freight revenues and thus contributes liberally to the maintenance of the carriers. Here, again, figures are interesting.

Commodity statistics compiled by the Interstate Commerce Commission show that shipments of passenger cars, trucks and parts ranked fourth in 1921 in the number of carloads of manufactured articles carried by the railroads. The total was 359,472 carloads. Refined petroleum and its products came first with 983,264 carloads and it should not be forgotten that a very large fraction of these shipments consisted of gasoline used as fuel for motor vehicles.

It would seem, on the basis of these figures, that the automotive industry contributed vastly more to the railroads than the small fraction of the carriers' taxes which can be charged against highway construction.

Carrying the case still further, the freight paid on shipments of road building materials and machinery for the construction of the highways to which the carriers object so strenuously, would pay a considerable part of the total railroad tax bill.

One of the troubles with the railroads is that they have acquired the temperament of a pampered child. They were reared in the lap of luxury. They grew accustomed to having their own way in everything. They finally reached the point where they said, "The public be d—d."

Then came adversity. They had bitten the hand that fed them. They weren't accustomed to adversity and they still had the feeling that they should be pampered.

That habit of thought never has been entirely overcome. It is possible to feel sorry for the railroads and more especially the owners of railroad securities because the carriers have not been prosperous in recent years, but it does not of necessity include sympathy with a dog in the manger attitude. For one reason and another the roads have not kept pace with the business and industrial development of the country. Additions to their mileage have been practically negligible. Equipment is inadequate to present needs.

It is true that there has been a remarkable development of highway transport in the last five years, but the carriers themselves were

responsible in the beginning. They were unable to handle the freight offered them and shippers had to resort to the motor truck in self defense. It proved so economical and efficient that they continued to use it when the railroads had a lot of idle equipment on their hands during the lean months of depression.

CONDITIONS exactly parallel to those which gave highway transport its first impetus again prevail and the railroads are unable to carry the freight offered them. They haven't kept pace with the growth of the country and they can't handle the traffic produced by normal business conditions.

That was the genesis of highway transport of freight. The same situation holds in the passenger carrying field. The railroads have taken off many of their short-haul trains and were it not for motor cars and motor bus lines the people living in the towns called "way stations" would find their movements sadly circumscribed. These trains were taken off because they didn't pay. Another reason for the falling off in railroad passenger business has been the fact that at present rates of fare it is cheaper to travel in a bus and almost as cheap to drive one's own car.

Herein can be found the explanation, plus considerations of comfort, for the fact that 6,990,862,000 passen-

THE railroad tax bill in 1921 for the entire country was only \$276,500,000 as compared with \$341,000,000 in special levies alone on the users of motor vehicles, to say nothing of the corporation imposts paid by companies in the automotive industry.

These figures, obtained from official sources, show how little basis there is for the contention of the carriers that they bear an unfairly large part of the cost of building improved highways.

This article is an analysis of the comparative taxation burdens of the carriers and motor vehicle users. It shows that not only do motor vehicle users and makers pay a heavier tax bill, but that the automotive industry provides an important part of the railroad freight revenue.

gers were carried 70,820,000,000 miles in motor cars last year, while the railroads were carrying 1,034,315,000 a total distance of 37,329,114,000 miles.

On the commercial side, motor trucks moved 1,430,000,-000 tons of freight a distance of only 6,479,200,000 ton-

miles, while the railroads were carrying 1,642,251,000 tons a distance of 306,755,332,000 ton-miles. It readily can be seen that the carriers get the profitable long haul business and that the short-haul freight, which is unprofitable for them, goes to the motor truck.

Battery Replaces Magneto Ignition in New Locomobile Model

SINCE the recent reorganization of the Locomobile Co. of America under the leadership of W. C. Durant a new series of Locomobile known as Series 8 has been announced. The general features of the car remain the same but important changes have been made in numerous details. It may here be recalled that some of the characteristic features of the Locomobile are the six-cylinder, low speed, side valve engine with a bronze crankcase and cylinders cast in pairs; a full-floating rear axle with radius rods and torque arm and double brake drums on the rear wheels.

A change of considerable importance is the adoption of battery instead of magneto ignition. The system adopted is the Delco dual system, consisting of two independent units, each with its own coil, breaker and distributor. With this system two sparks are produced in each cylinder at different points of the combustion chamber, thus insuring more rapid completion of the process of combustion and adding to the power and economy of the engine. The two sparks are purposely not synchronized, that over the exhaust valve being set to occur from 5 to 7 deg. earlier than that over the inlet valve, this having been found to prevent detonation. A wider speed range on high gear and more silent operation are claimed as other advantages resulting from the use of the new ignition system.

More silent operation has evidently been one of the chief aims of the Locomobile engineers in revising the design of the car, for most of the important changes have some bearing on this feature. Thus a new camshaft drive has been adopted, comprising camshaft gears of a new non-metallic material known as Textoil, manufactured by the General Electric Co. The cams have also been re-designed and the pitch of the inclines so altered that their operation is noiseless at all engine speeds, it is claimed. The spiral angle of the camshaft gears has been increased materially, to 28 deg.

Numerous minor changes have also been made in the engine. Thus, for instance, the pistons are now given greater relief, and the piston pins are secured in the piston bosses by a single pin screw extending all the way through the piston boss, instead of by two screws, as has been Locomobile practice in the past. The oil reservoir is now cast integral with the engine.

Slight modifications have also been made in the carbureter and its connection to the engine. The inlet manifold is now hot water-jacketed and is so connected to the engine cooling system as to induce a powerful circulation of hot water through the manifold jacket.

A novel principle has been incorporated in the clutch which is of the dry disk type. The driving set of disks is made of molded Raybestos and one set of metal disks is thus eliminated. In order to reduce the pressure on the driving teeth, both the internal and external diameters of the disks have been increased somewhat, and the driving disks are cut with 183 teeth on their outer circumference, with the result that the full-load driving pressure on these teeth is only about one-half pound each. There are seven disks to the clutch. Right within the clutch is a Thermoid fabric universal joint which

tends to prevent chatter of the clutch due to the periodicity of the universal joints in the final drive. The pressure required to release the clutch has been reduced.

For the gearset the Locomobile company has adopted the Maag system of ground gears. These gears are used for the constant mesh, the reverse and the third speed set, the latter being the pair most used of the intermediate gears. A splined shaft has been substituted for the square shaft heretofore used. This splined shaft is ground on the sides and at the bottom of the splines, which, of course, tends to insure accurate mesh of the gears. The direct drive clutch has been changed from a four-tooth to a three-tooth design, the object being to make it possible to grind the engaging faces of the teeth by running a grinding wheel right through between teeth. With the direct drive clutch teeth ground after hardening there is absolutely no shake in this member. The teeth of the gearset are tested on the Maag tooth outline indicator and must be within 0.002 in. The pressure angle of the transmission gears is now 20 deg. instead of 14½ deg., as formerly.

Improved riding qualities are provided by a change in the spring design, whereby an increased number of leaves is provided in the springs. Each front spring has 16 leaves of varying gage, while the lower part of the rear springs has 11 leaves of the same character.

There has been no change in body styles. The chassis price is \$6,800, while car prices range from \$7,600 for the touring car to \$11,000 for the sedan.

THE automotive division of the Department of Commerce has undertaken a world survey of various automotive products. This survey will give data on prices, preferences, prevailing types of bodies, and mechanical features and will furnish information on the sale of motor funeral cars and ambulances, motorcycles, motor boats and aviation equipment in addition to complete data on motor vehicles.

This survey will be available to exporters before the middle of the coming year. It will consist of three parts, as follows:

(a) World's Automotive Potentiality. A tabulated analysis with explanatory notes of the factors by which the automotive development possibilities of each foreign market can be gaged.

(b) World's Automotive Selling Seasons. A table illustrating the average monthly sales fluctuations in overseas markets with comments regarding the climatic and economic factors upon which these periodical changes are based.

(c) World's Automotive Sales Forecast. A bulletin issued quarterly stating the sales prospects in various markets and accompanied by a detailed analysis of the current factors based on data from the first two parts of the sales survey and on reports received from the field for this special purpose.

The Automotive World Sales Survey will enable the American automotive exporters to work foreign markets more scientifically and consequently create more effective take-ups for the sales fluctuations here and abroad.

Novel Body Design Features Shown at Automobile Salon

Two special collapsible cabriolets are exhibited. Disappearing steps on one body. Four-wheel brakes and overhead camshafts prominent on foreign cars. Closed models predominate. Phaetons have sport model characteristics. Twelve foreign makes present.

Facts About the Automobile Salon

Number of exhibitors.....	38	Models shown (continued)—		Chauffeur driven	41
Car manufacturers	19	Broughams	12	Owner driven	30
Cars by coachmakers.....	7	Phaetons	11		
Coachwork exhibits	12	Sedans	10	Open models	14
Models shown	83	Landaulet sedans	4	Closed models	57
Stripped chassis	12	Roadsters	2		
Berlines	13	Coupes	2	Foreign cars	12
Cabriolets	13	Landaulet berline	1	Domestic cars	14
		Phaeton with victoria top...	1		

THIRTY-EIGHT exhibitors show 83 kinds of high-priced coach and chassis work at the Eighteenth Annual Automobile Salon, which opened at the Hotel Commodore, New York, on Dec. 4. Seventy-one different body models appear this year as against 60 last year, while the present exhibit exceeds previous ones both in beauty and size.

Features of the show include novel collapsible sashes on the new Rubay and on the Voisin, disappearing steps on a luxurious Isotta-Fraschini body, a distinct trend toward overhead camshafts in the European cars, a Lancia chassis of unusual design and a general increase in completeness and refinement of all body appointments.

There are 12 foreign and 14 domestic cars shown, while 12 coachmakers have special body exhibits. Cabriolets and berlines are again the dominating body types as they were last year, but there is a distinct increase in the number of broughams and sedans in this exhibit. Closed models outnumber open models by 57 to 14, this proportion being about the same as usual at Salon exhibits.

A surprisingly large number of owner driven cars are shown, considering the type of buyer to which the Salon cars appeal. Of the 71 body models, 41 are chauffeur driven, while 30 are owner driven. Some of the cars which are listed as owner driven, however, might readily be chauffeur driven if so desired.

Practically all of the phaetons have many of the characteristics of a sport model, including bright colors, many accessories and generally racy lines.

From a domestic viewpoint, the new Rubay line is perhaps the most interesting, since it comprises the only entirely new domestic cars in the Salon. Foreign countries represented include England, France, Germany, Belgium, Italy and Spain. American cars shown include Brewster, Cunningham, Rubay, Daniels, Duesenberg, Rolls-Royce, Winton, Cadillac, Packard, Lafayette, Lin-

coln, Marmon, Locomobile and Peerless. Foreign exhibitors are Benz, Fiat, Hispano-Suiza, Hotchkiss, Isotta-Fraschini, Lanchester, Mercedes, Minerva, Panhard, Sunbeam and Voisin.

Many of the high grade closed cars exhibited carry the spare tires or spare wheels at the side of the car, owing to the fact that they have a trunk rack at the rear. Access to the trunk would be difficult if there were a spare wheel behind it.

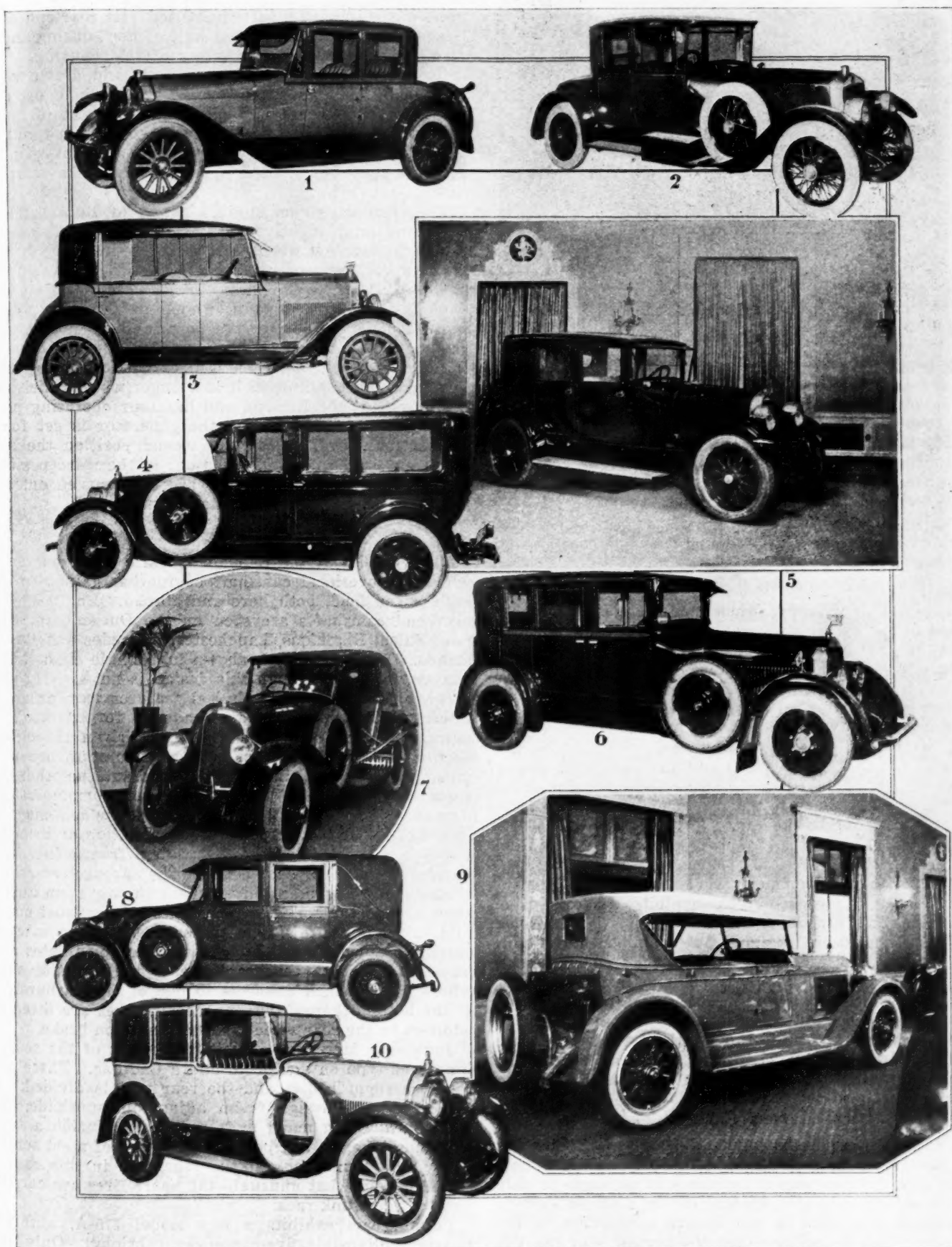
An outstanding feature in body construction is the use of raised panels permitting the effective use of two colors. There are several cars embodying this feature. In one instance the raised panel extends from the forward end of the hood, gradually widening until it extends the whole width of the cowl and then runs along the top of the side panels. In one case the effect is accentuated by beading marking the outline of the panel. Both the raised panel and the bead are formed integral with the parts on which they appear.

Collapsible Cabriolets

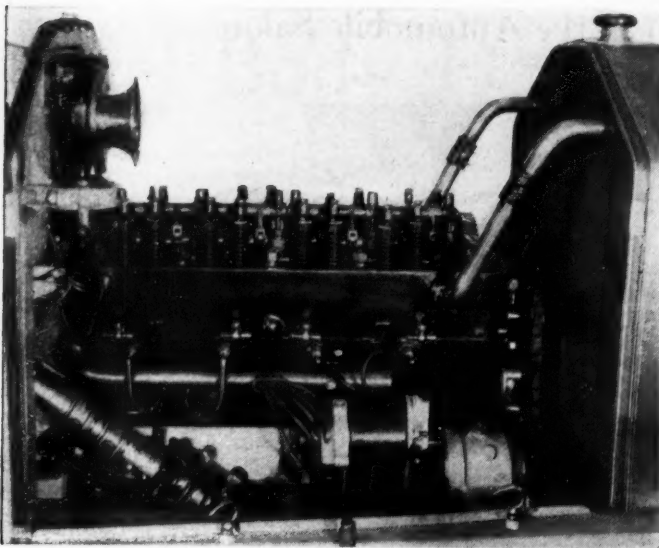
Two fully collapsible cabriolets are shown in which the front portion is entirely inclosed by glass in such a way that the vision is interfered with to a minimum. One of these is a French body by Million-Guiet and the other is by Leon Rubay. In the Million-Guiet body, which is mounted on a Voisin chassis, the front glasses are divided along the vertical center line and swing around hinge rods which take the place of the corner pillars. The glass in the door is also in two parts and is arranged to slide, so that the space over the doors can be half opened if desired.

When it is desired to drop all glasses, those in front are first swung through an angle of 270 deg. until they lie alongside of the side glasses and the hinge rods are loosened at the top and the assembly is dropped by a swinging motion into the front door, which is made with

Wide Variety of Bodies Shown at the Automobile Salon



1—Locomobile. 2—Lanchester. 3—Rubay with collapsible side panels. 4—Duesenberg. 5—Peerless with new windshield construction, LeBaron body. 6—Isotta-Fraschini with disappearing step. 7—Voisin with collapsible side panels. 8—Cunningham. 9—LaFayette with LeBaron body. 10—Peerless with Brooks-Ostruk body



Lancia small V-8 engine with overhead camshaft

an outer panel hinged at the bottom and opens up for the purpose of receiving the glasses. The glasses are rigidly locked and cannot rattle when down. With this arrangement of the glasses the following five combinations are possible:

- 1.—All glasses closed.
- 2.—Glasses over doors slid into open position.
- 3.—Front glasses swung alongside of side glasses.
- 4.—All glasses dropped.
- 5.—The whole top down.

In the Rubay cabriolet, when open the glasses are concealed in the center body panel which is made with an outer hinged member for the purpose. In putting the glasses in place, the center panel is first opened and all of the glasses on one side are then swung up by a single motion into the vertical position, the middle glass being here locked by two main locks on the side beam of the roof structure. The front and rear side glasses are folded over the middle glass and they are now swung into position, the front glass being locked to the front door and the rear one to the rear door. There are anti-rattle features on both doors.

Naturally enough, the majority of the cars exhibited are of the closed type, and among these the inclosed-drive limousine (berline) seems to be gaining in prominence. Thus Holbrook exhibits enclosed-drive limousines on a Lincoln and a Cadillac chassis with some slight differences in design. The body on the Cadillac has two glasses between the driver's compartment, and the rear, each with its own regulator in the rear compartment, while that on the Lincoln has only a single glass. There is one other difference between these inclosed drive limousines, in that on the Lincoln the extra seats in the rear compartment are concealed or disappear in the back of the front seat when folded up, while in the Cadillac they do not.

Lancia Chassis

A chassis of somewhat unusual design and which has not been seen in this country previously, is the Lancia eight with the two sets of cylinders at an angle of only 14 deg. Both sets of cylinders are in a single casting and there is nothing in the outside appearance of the cylinder block to indicate that the engine is of the Vee type. Between the throws of the crankshaft there is an angle of 46 deg. and this is said to insure evenly-spaced explosions. The water pump is mounted in front instead of back of the front engine supporting arm, a change

made to render the pump more accessible. An expanding type of transmission brake has been substituted for the contracting type. A very substantial torque arm of pressed steel channel section is used. Its rear end is of the same diameter as the rear axle center housing and is clamped between the two halves of this housing. The axle housing is built up of malleable and drawn steel parts, with substantial ribs on the center housing, and the various parts are welded together instead of being riveted. The flywheel is of the fan-spoked type and of unusually large diameter, especially for an eight-cylinder engine. It is cut with internal teeth for the starting motor.

The electric system on this car is of Robert Bosch make and is an eight-volt system. All switches are on top of the steering wheel, and therefore in a very handy position. At the center of the steering wheel is the usual knob or button for the horn. In this case, however, this knob has a rotating in addition to an axial motion. When pressed down it operates the horn, and when turned it shuts off the magneto in one position and switches on the dash lamp in the opposite one. Directly below this knob and concentric with it is a finger wheel which can be turned around its axis and has four operating positions. In the first position the generator is set for a double charging rate; in the second position the side lights or dim lights are turned on; in the third position the headlights and dim lights are both turned on, and in the fourth position all lights are turned off.

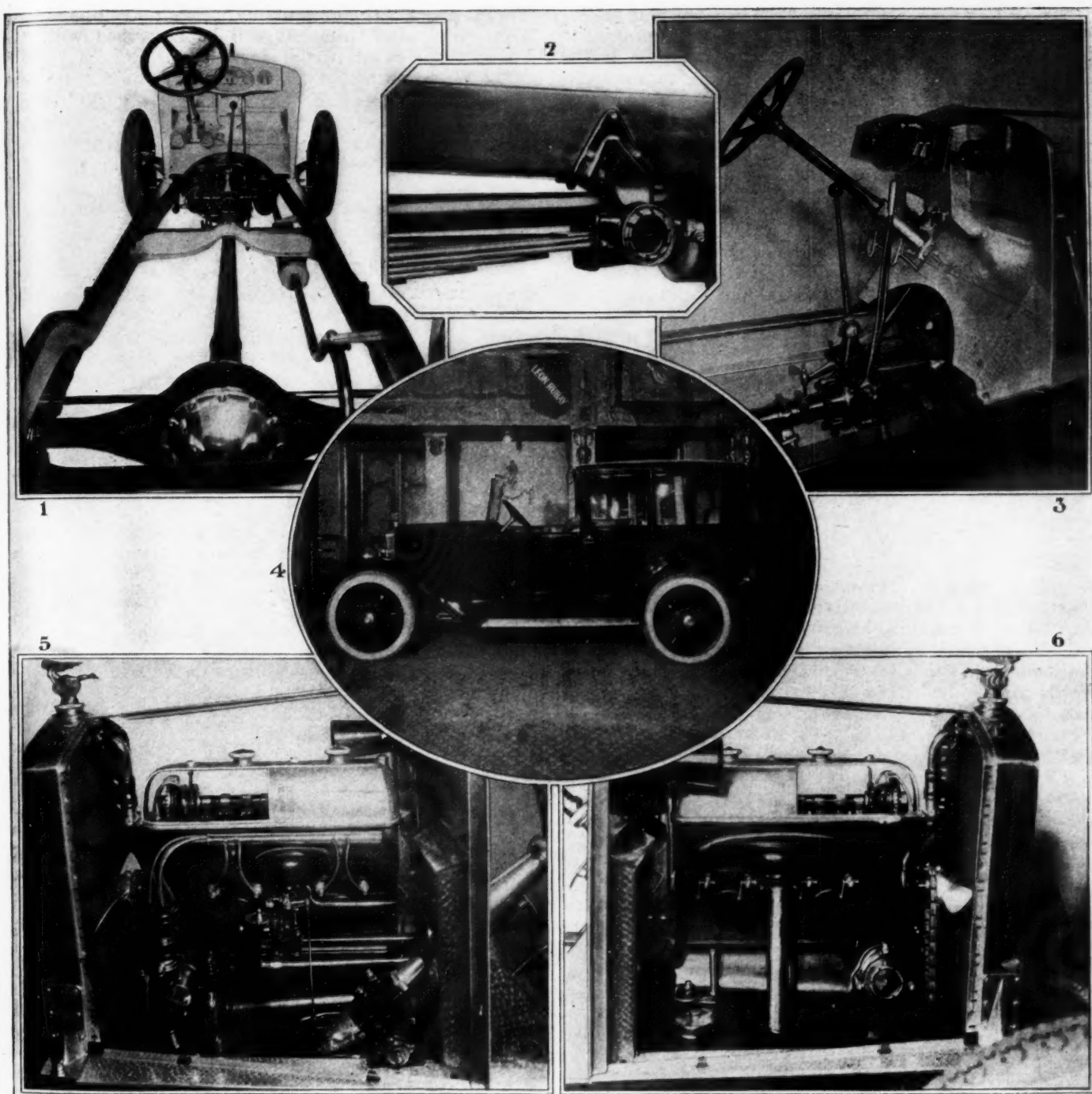
Overhead Camshafts Common

The exhibits at the Salon emphasize the prominence which the overhead camshaft engine has gained in the high-priced field, both here and abroad. Engines with overhead camshafts are seen on the Duesenberg, Hispano-Suiza, Hotchkiss, Lanchester, Mercedes and Rubay stands. The Mercedes is shown in a single six-cylinder chassis only, and though this design is not strictly new a few observations on technical features may prove of interest. The cylinders are made of forged steel, in pairs, and the overhead camshaft is driven through a vertical shaft at the front. Two carbureters are provided, one supplying the three forward and the other the three rear cylinders; there is, however, communication between the front and rear manifolds, which may be intended either for purposes of equalization or to make it possible to operate all six cylinders from either carbureter if the other should fail. The carbureters are of the concentric type and draw all of the air from an air stove around the horizontal portion of the exhaust manifold on the opposite side of the engine. A pipe extends vertically down from this stove and then bifurcates and passes underneath the crankcase to the opposite side, where each branch connects to one of the carbureters at the bottom thereof. Front wheel brakes are fitted in addition to the rear wheel and transmission brake.

Judkins & Merrimac exhibit two bodies of the sedan-limousine type on a Lincoln and a Cadillac. These are four-passenger bodies and the rear seat is divided. A feature of the design is an adjustable sunshade, the adjustment being made by a rod sliding inside a tube and being fixed in any position by means of a set screw. There is a trunk rack at the rear, and in this case—which is somewhat unusual—the spare tires are carried back of the trunk rack.

Cunningham exhibits a new model 115-A, a three-quarter collapsible five-passenger cabriolet. Only the portion of the top behind the doors collapses, and this part is made of Burbank material.

An entirely new chassis is exhibited by Leon Rubay. It is of distinctly foreign type and was designed abroad



1—View of Rubay chassis. 2—Detail of Rubay spring suspension. One end of each spring instead of being shackled, slides between hardened steel rollers. 3—Control members and instrument board on Rubay chassis. 4—Rubay towncar. 5—Left side of Rubay engine showing aluminum dashboard. 6—Right side of Rubay engine with overhead camshaft partly exposed

by a French engineer, but the design has been gone over here with a view to adapting it to American production methods, and the car will be manufactured in Cleveland. It is an example of the type of car now popular in Europe, with small-bore, high-speed four-cylinder engine, and should show very low fuel consumption.

The engine has cylinder dimensions of $2\frac{3}{4}$ by $5\frac{1}{2}$ in. and is so geared as to insure the maximum fuel efficiency at around 25 m.p.h. The cylinders are cast in a block which is mounted on the aluminum crankcase, the latter being provided with a web extending to the frame side members, thus closing off the space beneath the crankcase. This helps to give the engine a very "clean" appearance. Water and oil connections are cast integral with the crankcase, and there is practically no outside

pipings. The crankcase oil drain is operated by a lever above the crankcase web, and the oil gage is located right alongside this drain lever. The overhead camshaft is driven by helical gears from the crankshaft at the forward end. Each valve rocker arm has a separate spring. Oil is supplied to the cams and rocker lever bearings by force feed. The camshaft drive gears at the top of the vertical shaft run in a bath of oil, which is maintained at such a level that the pinion is constantly submerged, the hollow vertical shaft serving as an overflow and return pipe. In order to obtain a straight-line drive, the engine is mounted at a slight angle in the fore and aft direction. The cylinders are offset $\frac{7}{8}$ in. Lynite pistons and connecting rods are used. The engine has three main bearings.

The air pipe from the stove on the exhaust pipe passes through the engine. A machined cast-aluminum dash is provided and has the instrument board as well as the steering column secured to it. All wiring is concealed between the dash and the instrument board. The vacuum tank, at the forward side of the dash, is half concealed in a recess in same. There is a valve at the bottom of the vacuum tank which can be shut off and locked from inside the car. The entire electric system, including battery ignition, is of American Bosch make. The carburetor is a Rubay-Stromberg.

Special attention deserves to be called to the neat layout of the instrument board. On opposite sides there are round bases with two levers each, which look like switch handles, those on opposite sides being rigidly uniform. The levers on the right-hand side control the ignition and the lights, while those on the left-hand side control the starter and the choke. There is also a central instrument panel on the board and this carries an oil gage, ammeter, fuel gage, clock and speedometer.

Single-Plate Clutch

The clutch is a single-plate type running in oil. There is nothing unusual in the three-speed and reverse gearbox, which is combined with the engine into a unit power plant. Generator and starter are located back of the bell housing on opposite sides of the gearbox, quite symmetrically. The generator is driven from the crankshaft through a silent chain with eccentric bushing adjustment for tension and wear. A feature of the generator mounting is that the generator can be removed without disturbing the drive.

Owing to the fact that the engine is tilted for a straight-line drive, only a single universal joint is used at the forward end of the propeller shaft. It is inclosed in a spherical housing at the rear end of the gearbox and receives its lubricant from that box. The rear axle is of the full floating type, having a pressed steel housing with the usual two large openings at the center. The rear plate is the gear carrier, and when it is removed the entire differential and bevel-gear driving set comes with it, there being a splined joint in the propeller shaft some little distance ahead of the bevel pinion. One advantage of this construction is that the bevel gears of the final drive can be accurately adjusted away from the axle. Timken roller bearings are used throughout the rear axle.

Novel Spring Suspension

There is a novel point in the spring suspension which comprises half-elliptic springs at both front and rear. The rear end of the front and the front end of the rear springs instead of being shackled in the usual manner, are rolled out flat and pass between two hardened-steel rollers which are neatly encased in the spring brackets and provided with means for lubrication. The car is provided with four wheel brakes mechanically controlled. These brakes are of Rubay design and both sets are equalized. Steel ribbons are used for the brake connections, instead of round rods. The brake drums are made of aluminum castings which have a steel lining cast into them, while the brake shoes, also of aluminum, are provided with the regular asbestos fabric facing. By means of the brake pedal all four brakes are applied simultaneously, while the hand lever applies only the rear brakes. The front brake actuating shaft is concealed within the modified I section front axle. The Dot pressure lubricating system is used for chassis bearing parts, including the spring leaves. These receive lubricant through a hollow center bolt, the wall of which is drilled with holes to feed into the spaces between adjacent leaves.

The car has a wheelbase of 118 in. and is equipped with 32 by 4-in. cord tires. It will be furnished with five standard bodies, all of the closed type.

The Winton company has this year brought out a five-passenger sedan to take the place of the four-passenger sedan of previous years. The chief object in bringing out this new design was to provide additional leg room in the rear compartment. It is built on a chassis of the same wheelbase as the seven-passenger Winton sedan but is closed-coupled. This brings the rear seat farther forward and enhances its riding qualities, and at the same time gives space in the rear for a good-size trunk, for which a rack is provided. This is of somewhat unusual construction. The floor of the body is extended back of the rear compartment over the fuel tank and is provided with wooden slats on which the trunk can rest, while the rear of the body has the usual metal bar protectors.

J. Frank de Causse, who is body designer for the Locomobile Company of America, has an exhibit of Locomobiles with various types of body. A feature at this booth that attracts attention—though we believe it is not entirely new—is an open car with a spacious cowl for the rear seat, which is hinged to the top of the front seat back and swings out of the way when the passengers enter or alight. This cowl extends back as far as the rear edge of the rear door, and together with a sloping rear windshield extending from its rearward edge, and a Victoria top gives almost as much protection as a closed body.

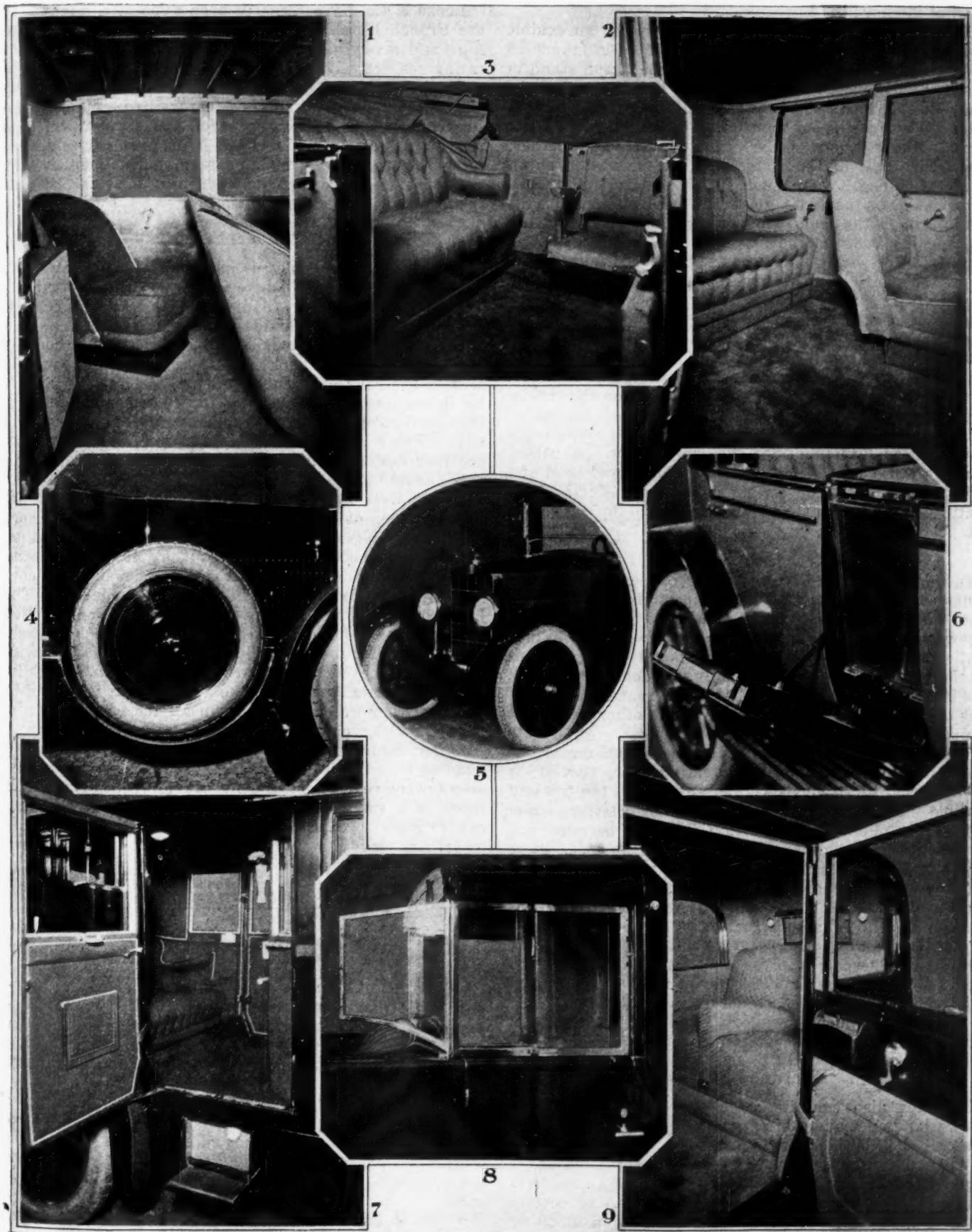
New Rubay Voiture de Ville

One of the most extensive exhibits at this year's show is that of Leon Rubay. This is really in two sections, one featuring the chassis and the all-collapsible cabriolet and the other out in the hall, comprising other closed-body models. One feature of all of this year's Rubay models is wooden running boards in natural wood finish, with longitudinal grooves and drain holes. These running boards are provided with protection bars of nickel.

The Benz exhibit contains both four and six-cylinder models with Fleetwood bodies. One is an inclosed-drive limousine with gold trim, another a town brougham and a third a six-passenger de luxe cabriolet.

Hume of Boston exhibits a four-passenger sedan embodying several features of interest. The rear seat is divided, but the partition can be removed and the car then accommodates five passengers. This body is of the soft-roof type, which latterly seems to be coming into favor with numerous body builders and presumably also with the buying public. The construction is of what is known as the skeleton type, the ribs or bars supporting the soft material being exposed to view from the inside. There are two advantages to this construction. It obviously gives a materially lighter body than a solid roof would, and, besides, it does away with the rumbling noise which is so objectionable with some forms of solid-roofed bodies. Hume has been building this type of roof construction for some time, but in the model exhibited one important change has been made. Formerly the soft material extended to the edge of the roof and overlapped the metal sides, but now the metal is carried over the edge and extended across the roof for about 6 in., where it joins the soft material. The joint is covered by a bead set in cement. The roof ribs are made of ash, the same as the rest of the body, but are stained to match the interior trim of American walnut. In order to increase the angle of vision through the front corner glasses—the front glass being sloped—the front pillar of the door frame is beveled off or made triangular in section. Inside the front compartment forward of the door frames there are

Body Details of Cars Exhibited at the Automobile Salon



1—Interior of Brewster body on Lanchester car. This is a two-door sedan, one door being located on the left front and the other on the right rear. 2—Interior of new Locomobile body. 3—Interior of Healey phaeton body on Cadillac. 4—Novel tire carrier on Isotta-Fraschini. 5—Distinctive radiator marking of the new Rubay. 6—Showing how side glasses are concealed in central body panel of Rubay cabriolet. 7—Isotta-Fraschini, showing disappearing step. 8—Arrangement of glass on Million-Guiet all-collapsible cabriolet. 9—Hume body on Marmon, showing divided rear seat

cabinets on both sides for towels, licenses, maps, etc. The material chiefly used for these soft or ribbed roofs is what is known as Burbank.

Le Baron, a New York coach designer, has an exhibit of several bodies, besides being represented at stands of body builders. One of the cars at the Le Baron stand is a special five-passenger sedan built by the Bridgeport Body Co. It has a glass in front of the vizzor which is intended to insure good ventilation of the front compartment without exposing the occupants to the weather. The upper half of the windshield can be swung at an angle of 45 deg. for instance, in which case the air will enter between the front glass and windshield top half, pass through the front compartment and leave through the opening between the halves of the windshield, it is claimed. The windshield may also be opened just enough to get the clear vision effect. Another advantage claimed for the front glass is that it serves to keep the snow off the windshield.

Another model shown is an all-collapsible cabriolet with skeleton construction and covering of Burbank material. There is thus just one thickness of material instead of leather on the outside and cloth on the inside, as has been the usual construction so far. All fittings of this body are leather-covered. There is also exhibited a town car or brougham for five passengers. A raised panel is worked into the metal of the hood and cowl and gives opportunity for an unusual color effect. This feature has been extensively made use of by Le Baron the past year.

Brewster Coupe

Brewster shows a four-passenger coupe with what he considers the best seating arrangement for a small job. There is an individual seat for each of the passengers. The rear seats swing up out of the way when not in use, while the front seats are of the bucket type of pressed-steel construction. There are only two doors, staggered, one in front at the left, the other at the rear on the right. The driver's seat is adjustable while the other front seat is fixed in position.

The windshield is of special construction and is of what is referred to as the retreating type, that is, it leans forward. It consists of three glasses, the top and bottom ones being permanently fixed in position, while the middle one is adjustable. The joint between the intermediate and lower glasses is curved upward. It is claimed that this glass gives a rain vision effect and good ventilation, and kills any glare from the sun. The body has a skeleton finish and soft roof, the trim being in natural ash. The construction is exceptionally light all through, and another desirable feature is the great visibility. There is a pressed metal ventilator in the roof and a rectangular glass in the rear. The body is finished with Brewster oil finish in two shades of brown and striped in burnt orange. The interior trim is in brown vici kid and the seats are covered with box cloth.

Fleetwood Bodies

Brewster also exhibits an enclosed-drive limousine, a town landaulet and a brougham.

Fleetwood, besides having its own exhibit of body models all mounted on chassis of well-known makes, is represented by bodies on the stands of many importers and domestic car manufacturers. The only thing strictly new on the Fleetwood stand is a combination stopping signal, rear light and parking or backing light. This consists of a cylindrical metal case having the word Stop stenciled out in the upper portion of the front, and red and clear-glass lenses in the lower part. The concern also shows a combined ventilator and dome light,

the ventilator openings being around the base of the dome lamp.

Locke & Co. have recently been appointed agents for the French Hotchkiss car, which they show in both the four and six-cylinder models, of 12 and 30-hp. French rating respectively.

On the Rolls-Royce stand there are a number of different types of cars on display, a feature being made of the suburban limousine seating seven passengers, which is regarded as a family model and is made roomy and comfortable in both the front and rear compartments. The new open model brought out last spring at the time of the price revision is also shown.

Sport Model Features

Demarest & Co. show a sport model on a Peerless chassis, which has a feature in the form of a compartment behind the seat adapted to take two golf bags. There is a door on each side of this compartment and an automatic light inside is extinguished as the door is closed. The space back of the two-passenger rumble seat is used for a lunch kit and an ice box. This is a Le Baron design and contains the raised panel feature, the panel extending forward to the rear edge of the hood only. The edge of the rumble seat enters a channel in the rear deck, and any water that gets in is caught in this channel and led off through a copper tube.

Brooks-Ostruk show a completely collapsible cabriolet with a raised panel on the hood, cowl and sides. There is also an integral raised bead on the edge of the panel, heightening the effect sought by the panel. A special wheel carrying device of great rigidity is shown. It consists of two rods extending to the frame side rail. The bases of these rods hook over the top edge of the side rail and are secured in position by a single bolt each. There are tortoise-shell moldings on the doors and windows and the other fittings are made to match. Two disappearing seats slide under the driver's seat when not in use, and they need not be drawn all the way out if the person occupying one of them desires to sit sideways. Another model shown is a cabriolet with half length running board in front carrying a tool box and a separate step for the rear compartment. At the front of this step there is a small fender which together with the rear fender gives a coach effect. All interior fittings of this model are of 14-carat gold. The fenders are only very slightly crowned to give the effect of leather fenders.

Bus Service in Shanghai

A MOTOR bus service has been inaugurated in the international settlement of Shanghai, carrying passengers from the lower part of the town to Jessfield, a distance of five miles, for a fare of \$.30 silver, according to a report to the automotive division of the Department of Commerce.

A motor bus service between Changsha and Siangtan has been started by a French company with head offices in Hankow. The company has 24 cars available and the service will be extended from Siangtan westward over the road built by the famine refugees.

Six German Benz buses have been bought for a Foocho motor bus service and will arrive in Shanghai shortly.

An auto bus line has recently been established between Mexico City and Cuernabaca in connection with the hotel resort at the latter place. This service is operated by Americans.

Special British Design Features Shown in Three New Models

Two detachable heads on engine of six-cylinder Star facilitate handling. Daimler adopts single plate clutch and trussed steel body frame. Talbot engine accessories arranged in novel manner. Battery ignition gains in use.

By M. W. Bourdon

SPECIAL design features appear on three new British cars which are of particular interest to American engineers. On the new Star six-cylinder car, with 2.72 x 5.12-in. cylinders, cast in a block separate from the crankcase, two detachable heads are used, each covering three cylinders. It is admitted that this arrangement adds slightly to production costs, but it is held that the greater ease of handling the smaller units and of remaking the smaller joints warrants this extra cost.

The unit power plant system is utilized, the upper part of the two-part crankcase having four arms with web extensions to the frame. On the left-hand web are mounted the water pump and magneto in tandem, while on the right the steering casing is carried on an upright integral bracket. A feature of the gearset casing is the provision of a "tunnel" serving as a support for the starting motor. The motor casing is a sliding fit in this tunnel and is held firmly by two drawbolts grooved to accord with the periphery of the casing, where they would otherwise "stand proud" within the latter.

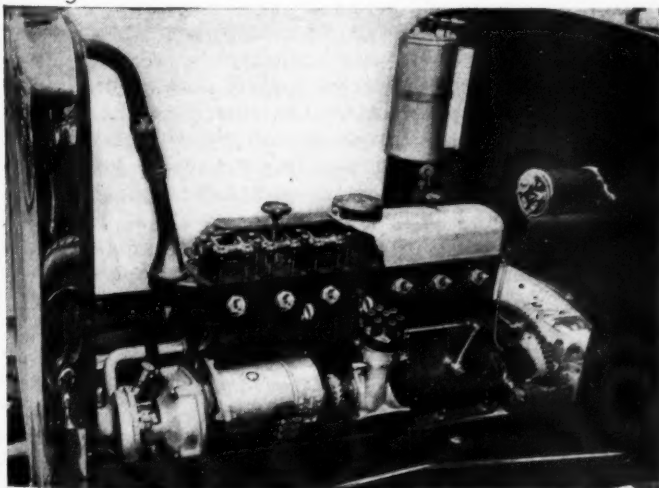
Fabric disk joints are used for the open propeller shaft, but a point of note is that one of each pair of spiders has a projecting central boss made slightly spherical to enter a sleeve extension of the other spider and form a pilot bearing. It has been found with high-speed engines that a great deal of vibration may be

caused owing to the disk failing to keep the propeller shaft in axial alignment with the driving shaft. Obviously, a propeller shaft rotating at 2000 to 3000 r.p.m. an eighth of an inch out is a serious matter. The provision of pilot bearings for the pairs of spiders is a comparatively simply way of overcoming the defect.

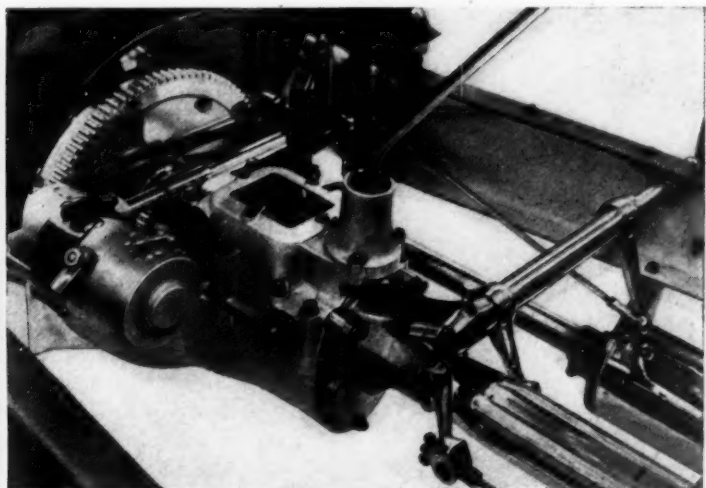
Daimler and B. S. A.

Several of the new Daimler and B. S. A. models use battery ignition, and the ignition system on these cars comprises an automatic switch controlled by the vacuum in the inlet manifold which cuts off the ignition current when the engine is "killed." In the case of the 12-hp. Daimler Six, which has 2.32 by 3.7-in. cylinders, the extraordinary low rear axle ratio of 6.17 to 1 has been adopted, which gives a road speed of only 30 m.p.h. at 2100 r.p.m. of the engine. The same ratio is used with the 16-hp. model, which has a somewhat larger wheel diameter.

Among the features common to all new Daimlers is a valve in the water inlet pipe to the cylinders to control the engine temperature, and in the largest model this is supplemented by a thermometer on the instrument board. The circulation control valve is coupled to the mixture control valve and is in operation only when a rich mixture is given for and after starting from cold.

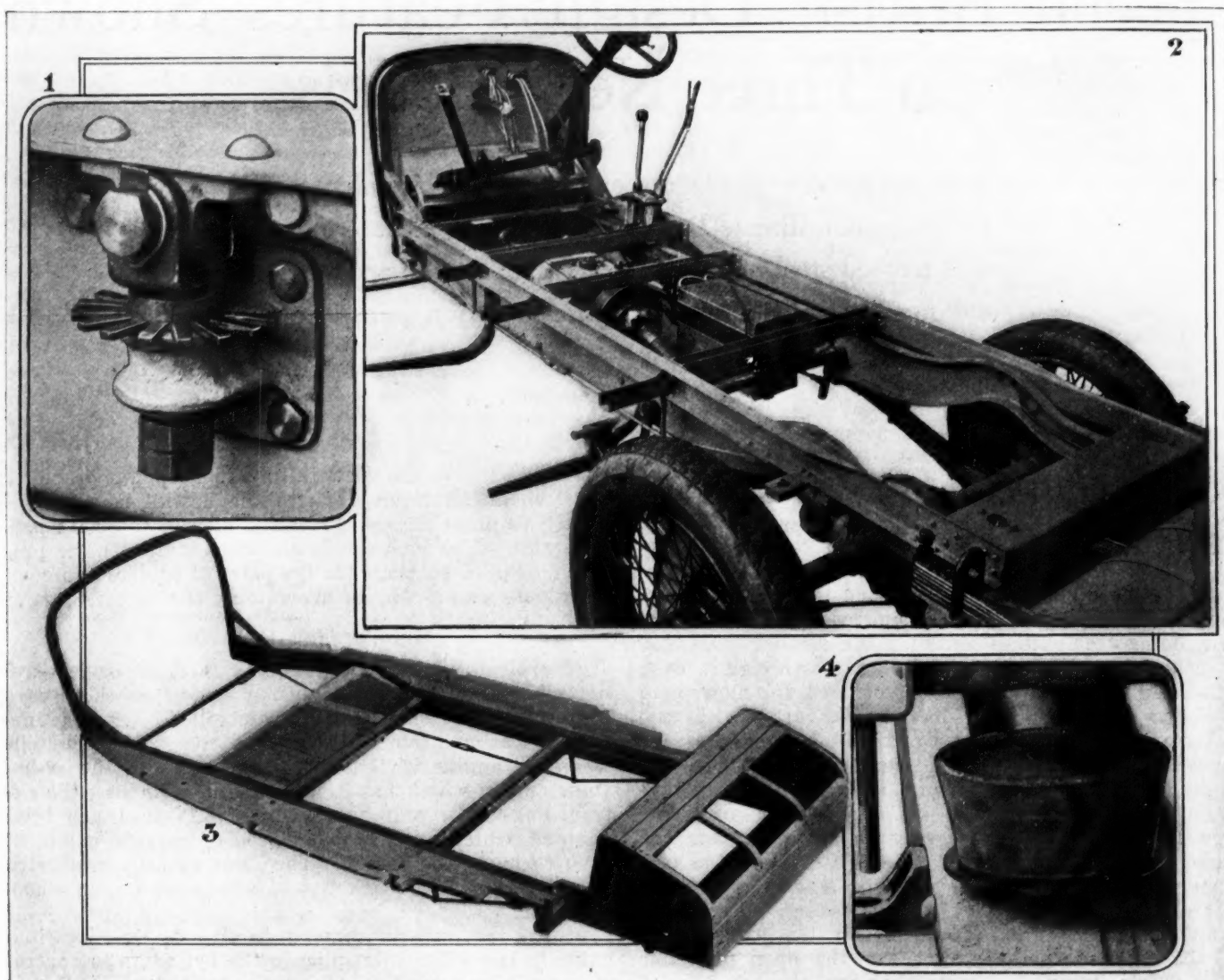


Engine of six-cylinder British Talbot

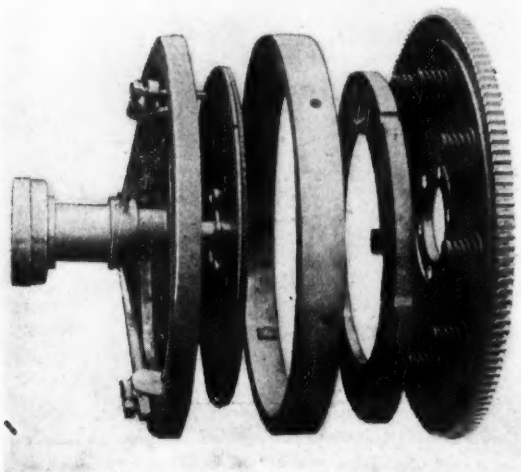


Gearset of new Talbot Six. Note enclosure of universal joint in rear end of casing

Daimler "Insulation" of Bodywork



Figs. 2 and 3 show pressed steel frame forming bodywork foundation attached to Daimler. Figs. 1 and 4 show front end hinge fitting and rear end bumper support which serve as a means of anchoring the special frame to the chassis frame. This is the Daimler practice to "insulate" the body from the chassis and to protect the body from frame distortion.



New Daimler single plate clutch in parts

The cone clutch, which has been used hitherto on Daimler cars, has been replaced by a single plate type. The actual flywheel is merely a steel disk with external teeth for the starting motor, the clutch casing, a separate cast-iron ring supplementing the function of the disk flywheel. Nine springs are used, these being non-adjustable and inclosed, with abutments consisting of pressed steel cups sunk through the flywheel disk. The friction surfaces are of fabric, one ring being secured to the driven plate and the other to the back cover.

Body "Insulated" from Chassis

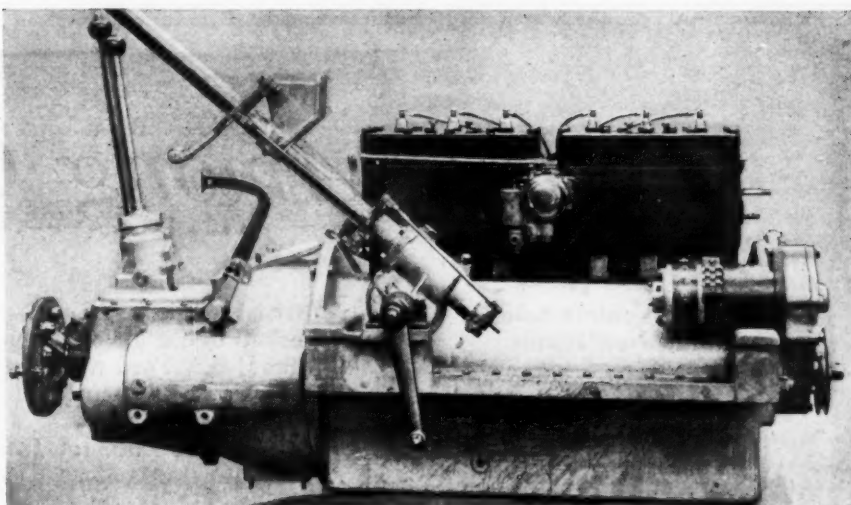
For many years past it has been Daimler practice to "insulate" the bodywork from the chassis by supporting it at four points—two front and two rear, with intervening rubber buffers. In order to carry out more completely this plan of mounting the body on the frame so that it is practically unaffected by frame distortion, all types of bodies are now being erected on a special channel steel frame of their own, this frame forming the

foundation of the body and remaining permanently an integral part of it; the system of anchorage to the chassis frame will in future comprise rubber buffers at one end and a hinge at the other end.

As usual, in new overhead valve designs, the pushrods on the six-cylinder 2.24 by 3.74-in. Talbot engine pass down through channels formed in the cylinder block, the latter in this case being integral with the upper half of the crankcase. The lower half of the crankcase in aluminum is continued rearwardly to form the clutch pit and bottom half of the three-speed transmission casing, this part housing the layshaft bearings, while the separate top half supports the central gearshift lever.

Projecting rearward from the gearcase is an overhanging bracket supporting one end of concentric brake shafts, the other ends being supported by the frame side members. The inner shaft carries the hand lever at its outer end. Two brake coupling rods run back closely adjacent under the torque tube to equalizers under the bevel pinion extension of the axle.

Reverting to the engine, aluminum pistons are used,



Right side of Star Six. Note tunnel for starter at right of gearset case

as are battery ignition and pump water circulation. The generator and distributor are separately mounted on the left side, being driven in tandem. Water pump is in line with these units but in front of camshaft gear housing.

New Type of Cylinder Boring Machine

THE machine herewith illustrated was originally developed for boring the individual cylinders and finishing off the head end of air-cooled engines. However, according to the designers, it can also be used for boring block-cast cylinders, and in case these have a separate head the machining time is materially reduced.

Three separate cuts are taken in boring a cylinder, and two in finishing the head. There are five spindles which rotate about their respective axes but are stationary in space, and all five cuts are taken at the same time in separate cylinders. The work is mounted in a rotary fixture having six positions, five working and one loading position. Loading and unloading are accomplished while cuts are being taken, so that only the time required to index the fixture counts as lost time. The work holder and work are fed upward onto the cutting tools by a cam, which makes it possible to obtain a quick return, a quick approach, uniform boring, a reduction in feed for finishing the head of the cylinder and a dwell for the final finish of the head. The time required for boring a $3\frac{1}{4}$ in. cylinder 9 $\frac{5}{32}$ in. long and finishing the head is given as $1\frac{1}{2}$ min.

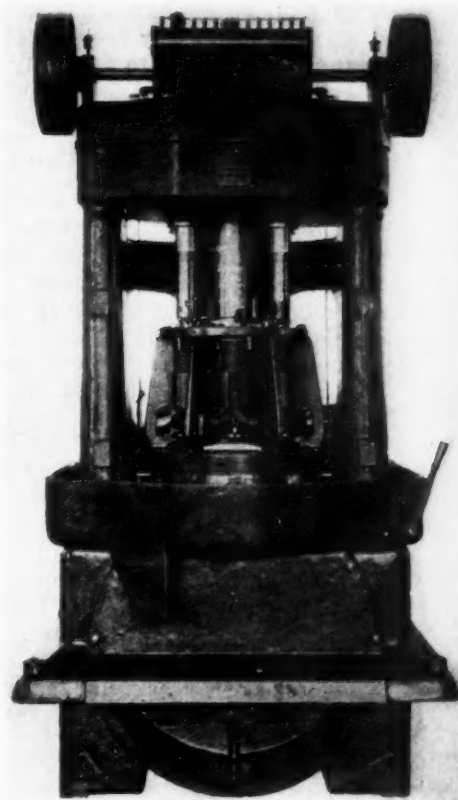
Among the advantages claimed for the machine is that the cutters and fixture are held rigidly in an accurate relation. This is due to the use of a large diameter pilot which is integral with the head of the machine and pilots in the ram which is actuated by the cam and on which is mounted the rotating fixture. The use of cam feed makes it possible to obtain a very quick approach, a variable feed and a quick return.

In order to keep the cylinders at a substantially constant temperature throughout the boring operation, a coolant is pumped through the spindles and discharged adjacent to the cutting tools onto the surfaces to be machined. The fact that the coolant passes through the spindles ends to maintain these at a constant temperature and to maintain a constant clearance between the spindles and their bearings. Chips are washed away by the coolant almost as soon as they are formed.

The machine is semi-automatic, the only duty of the operator being the loading and unloading of the work

while the machine is in operation, the indexing of the fixture when the machine comes to rest automatically at the end of the quick return, and throwing in of the clutch after the fixture has been indexed.

The machine described is of considerable size, measuring 8 ft. 2 in. in height to the top of the pulley and occupying approximately 5 ft. square of floor space. It was designed by O. C. Kavle and L. W. Moulton and is now in production.



*Kavle
&
Moulton
cylinder
boring
machine*

Just Among Ourselves

Motor Vehicle Sales Follow New Roads

MOTOR vehicle sales follow road improvements just as commerce followed the railroads in the old days when railroads were making extensions. Every mile of improved highway means a new potential market. Factory sales departments might find it profitable to study road building maps, especially in States where large sums are being expended. If distributors and rural dealers are not profiting from these improvements they are overlooking a lot of bets. Whenever a good road goes by a farm house, the occupants of that house will want a car or truck, or perhaps both, and they will buy them just as soon as they can get the money. The chances are about 50-50 that they have enough money right now.

British Manufacturers Cut Prices to Get Sales

BRITISH motor vehicle manufacturers have made up their minds that if they ever are to get their factories into anything like normal production they must follow the example of American producers and reduce prices. There have been many cuts of late. These apply both to new and used vehicles. The reductions range from \$200 to \$5,750. Manufacturers say they have been made possible by improved methods of production, lower prices for materials and lower wages for mechanics. Lack of demand probably has been the impelling motive, however. American-made cars also are cheaper and they are getting the lion's share of business. Wealthy Britons, paying to the Government in taxes a large part of their incomes, do not find it possible to indulge their fancy for deluxe cars. Going to the other extreme, motorcycles are as popular as ever.

British makers have been disturbed by an unconfirmed report that Henry Ford will place a motorcycle on the market at \$100.

Automotive Industry Jumps Far Into the Lead

THE automotive industry now is so far ahead of all rivals in the dollar value of its manufactured products that it no longer presents a comparison but rather a contrast. The following figures on the dollar values of 1922 production for the ten leading industries have been compiled by the Bureau of Foreign and Domestic Commerce, Bureau of the Census and the Bureau of Mines.

Automotive industry.....	\$2,865,000,000
Petroleum	2,050,000,000
Meat packing	1,935,000,000
Foundry	1,900,000,000
Lumber and timber.....	1,675,000,000
Iron and steel.....	1,650,000,000
Clothing	1,530,000,000
Flour mills	1,275,000,000
Cotton goods	1,250,000,000
Boots and shoes.....	1,100,000,000

The total for the automotive industry is sub-divided as follows: Cars and trucks, \$1,490,000,000; replacement parts, \$550,000,000; tires, \$675,000,000; accessories, \$150,000,000.

Warns Dealers Not to Strain Their Credit

G. BREWER GRIFFIN, manager of the automotive department of the Westinghouse Electric & Mfg. Co., is an optimist on the farm market.

"We are watchfully optimistic regarding the automotive vehicle business for 1923," he says, "as the general business of the entire country promises to be better than during 1922. Most cars sold this year have been sold in cities and large towns. It is thought the small towns and farmers will begin to buy shortly after the first of the new year.

"But dealers must be careful

not to overextend their credit capacities by sales on too low initial payments and too long-time payments if the support of local banks is needed or expected. There is a danger to dealers in selling cars to 'good moral risks' who have no fixed income, unattached real estate or nothing beyond a small salary or wages."

Doctor Can't See Why Schwab Loves Life

CHARLES M. SCHWAB has a sense of humor as well as a genius for business. He gave an inspirational talk the other day in Indianapolis to Stutz dealers and distributors in whom he has become much interested since he took financial control of the company. In telling of his plans for holding similar meetings frequently, he said he recently told his doctor that if he could be assured of living twenty-five years there were a lot of things he'd like to do.

"Do you smoke?" asked the doctor.

"No," replied Schwab.

"Do you drink?"

"Rarely."

"Have you any other vices?"

"No."

"Then," snapped the doctor, "why in blazes do you want to live twenty-five years?"

What Good Is Salesroom Without Salesmen?

AN illustration used by Schwab points a moral for a good many motor-car dealers.

"One day Mrs. Schwab and I were out walking in New York," he said, "and chanced to pass the ——— salesroom (naming a very expensive car). There in the window stood one of their magnificent automobiles selling around \$15,000. We looked over the car, my wife and I, but there was no sign of a salesman

More or Less Pertinent Comment on Topics of Current Interest to Men in the Industry

near it. No one seemed to care whether we received any attention or not, and we walked out of the store.

"I turned to my wife and said, 'Those people may build one of the finest automobiles in the world, but they run their business in a rotten way, and I wouldn't have one of their machines for love or money.'"

Have you ever been in a sales room where the atmosphere was somewhat the same?

Doherty Has a Scheme To Aid Trolley Lines

HENRY L. DOHERTY, who operates public service corporations all over the United States, believes in monopolies. He admitted it in a speech in Detroit not long ago. For one thing, he thinks there is an oversupply of taxicabs in the congested districts of most American cities and that service in other sections is a vacuum. He believes exclusive franchises might improve conditions. Another of his suggestions is that street railways could be used to do a large part of the delivery of goods in congested cities, especially at night. This would apply particularly to what "now requires heavy trucking." Doherty operates a good many street-car systems and the idea isn't a bad one—from his point of view.

Doesn't Want Drivers With "Telescopic Vision"

HEALTH COMMISSIONER H. COPELAND of New York, United States Senator-elect, strongly advocates rigid vision and hearing tests for all applicants for licenses to drive motor vehicles, particularly taxicabs and motor trucks. He is an eye and ear specialist and headed one of the draft boards during the war. In this work he discovered

that many men whose vision was good enough to see one particular thing could not take in other objects at the same glance. This is what is called "telescopic vision." He contends that a man with "telescopic vision" should not be permitted to drive such a vehicle as a taxicab. Perhaps he's right.

Railroads Optimistic But Is It Justified?

RAILROAD managers assert they have turned the corner and that freight congestion will be less serious from now on unless there is an exceptionally early and severe winter. They do not contend that their troubles and those of shippers are over but merely that they are getting untangled. Some of the congestion in yards has been relieved and more traffic is moving. It remains to be seen, however, whether their optimistic feeling is justified. It is significant that the peak of car loadings for the year seems to be past and that there has been a considerable shrinkage in the last few weeks in offerings of miscellaneous freight and merchandise. A decrease also is shown in the freight-car shortage but it may be accounted for by the decline in offerings of freight. Unless there is an unexpectedly heavy falling off in the volume of freight traffic, the car shortage probably will last for several months.

Farmers Will Buy But Only at Fair Price

THE automotive manufacturer who overlooks the fact that the buying power of the farmers of the country next year will be between \$1,250,000,000 and \$2,000,000,000 more than it was after the harvest of 1921, will be making a grave mistake. The current report of the Department

of Agriculture shows the value of the twelve leading crops to be approximately \$6,000,000,000 as compared with \$4,700,000,000 at this time last year. Values of crops still in the hands of farmers are going steadily higher. This applies especially to wheat and cotton. There are even predictions of 50-cent cotton, although it is to be hoped it will not go as high as that. The farm market will be a mighty good one in the next year but it must not be forgotten that it will be a buyers' market and the people who get the business will be the ones who give the farmer what he wants at what he thinks is a fair price.

Ford Will Give Time to Power Projects

ONE of the interesting angles in connection with reports that Henry Ford has practically completed negotiations for the purchase of nearly 200,000 acres of coal lands in eastern Kentucky and western West Virginia is the assertion that he proposes to construct a double-tracked electric railroad from some point in Kentucky to the Atlantic seaboard. Ford has said that he doesn't propose to buy any more railroads but he may build them if it suits his purpose. The electrification proposal is the significant feature. The lands he is expected to buy are mostly on the Big Sandy River, a navigable stream with direct connections to the Ohio River and with easy access to the Kentucky. If he builds a railroad and electrifies it, it is safe to say the current will be generated by water power. He also proposes to electrify the D., T. & I. More and more, as time goes on, will Ford devote his time, energy and money to the development of hydro-electric power.

J. D.

Problems Met in Design of Third Brush Generators

Service, production and operation must all be considered. Few other small units offer so wide a field for research. Selection of insulating materials and bearing types is important. Methods of commercial testing made more efficient.

By Warren P. Loudon

Automotive Engineering Dept., Westinghouse Electric & Manufacturing Co.

THE third brush generator, at first thought, appears to present a simple problem for the designer, but it is safe to state that there are few other units of similar weight and size which offer as wide and fertile a field for research. These problems are divided not only into the electrical and mechanical branches, but the manufacturing phase must be fully considered as well. Naturally, the foremost and most essential factor is the performance of the unit on the motor vehicle. All other ideas are contributory and are to be considered mainly as means to efficiently accomplish this end—for unless the generator gives satisfactory service to the car operator, the other advantages are lost, and any effort expended to gain them will have been wasted.

Since the first introduction of the third brush principle in 1888 by Tesla, to its original form for automobile use in 1914, and its present scheme of connections as finally adopted in 1916, this one unit has been the source of constant endeavor on the part of designers to improve its characteristics, decrease its size and weight and lower the operating losses. In order to visualize more clearly the broad scope of this problem, it might be well at this time to separate it into its several factors:

- (1) Operation.
- (2) Electrical characteristics.
- (3) Mechanical features.
- (4) Manufacturing.
- (5) Service.

These will be found to cover the ground quite fully. It should be kept in mind that none of the individual requirements can be considered wholly by themselves, but

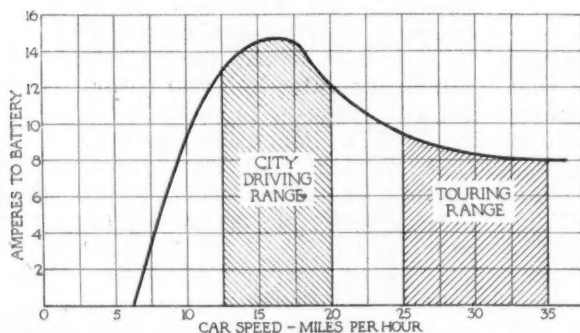
rather must be so correlated to the others that the final design will form a compact and efficient unit. The following points will serve both as a detail of the foregoing list, and as a suggestion of the many individual problems which are open for further study.

Storage Battery Relief

It is naturally desirable to relieve the storage battery at the earliest possible moment, and on this account a low cut-in speed (i.e.—the speed at which the generated armature voltage equals that of the battery) is essential. A steep front curve is likewise desirable to follow up the first point and permit the generator to carry the load. There are, however, two extreme conditions of battery charging to be provided for—the first encountered in city driving, where low rates of speed prevail, and frequent recourse to the starting motor is necessary, while lights will also be used quite often when the car is standing. Opposed to this service will be that of touring; where the car is driven at moderately high speeds for long periods of time, stopping and starting is infrequent; and if the lights are used it will generally be when the car is in motion and the generator capable of carrying the load. Hence, we must, with one generator setting (except possibly isolated cases of extremes) provide for either condition, since it is manifestly impossible to expect the operator to constantly manipulate the third brush to meet daily requirements.

The characteristics of the third brush generator are fortunately such that the proper charging rates are obtained at any speed. Our problem is therefore confined under this heading to obtaining the earliest possible cut-in speed and balance point, and after the peak output is reached, to have a sharp current decline with speed. The generator, to accomplish this, must be of the reaction type; that is, the ratio between the armature ampere-turns and the field ampere-turns must be comparatively large. Inasmuch as the generation of electricity depends upon the three factors of speed, density of magnetic circuit and the number of armature conductors, the proper results are obtained by using as many armature conductors as possible and by having a weak magnetic field. The large number of armature conductors permits of a low cut-in speed and the quick building up of the current curve.

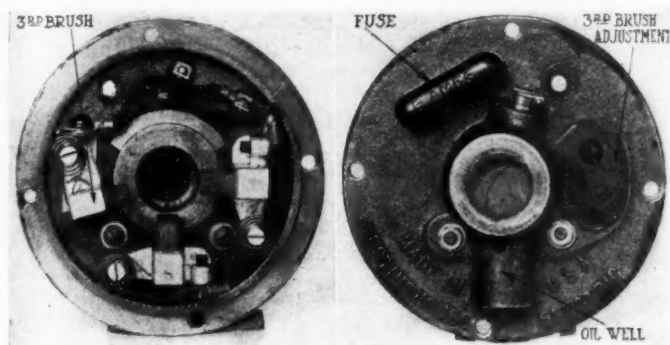
At the point where the magnetic field created by the armature conductors balances that of the field coil turns,



Curve of charging current, indicating two extreme ranges of operating conditions

distortion of the field magnetism occurs, throwing the flux over to the portion of the armature which does not furnish field current. This further cuts down the field current and causes a rapid decline in output.

One other point open to research would be to eliminate the inherent fault of the output rising as the battery charges—in other words, that these generators give a lesser output to a discharged battery than to a nearly charged one. This is the reverse of desirable battery charging, and at present the resources of the designer



Inside and outside view of commutator end header

are limited to making this increase as slight as possible. By choosing a suitable point on the magnetic saturation curve (preferably near the knee), a very slight increase of field flux will be had for any increase in line voltage. It is necessary to compromise in this case, however; otherwise, going too far toward minimizing this latter condition will upset the action of the armature distortion at the proper point and prevent the current decline, giving a characteristic more of the order of a bucking-series generator.

Naturally, the designer is constantly seeking to improve the efficiency of his units as well as to decrease their weight and size. However, in striving for this end he must also produce what is known as "sparkless" commutation; otherwise, excessive brush wear will be encountered and his design fail on this account.

The attainment of satisfactory commutation conditions depends upon a number of varying factors, and is in itself a subject for considerable study; of far too much length to be treated to any extent in this article. It would perhaps be sufficient to give some of the governing features:

The neutral zone, that is, the space between pole faces, where the magnetic fluxes are not present to any extent, should be kept as wide as possible. The skew or spiral of the armature slots should not be greater than is necessary to give a smooth reversal of commutating current; otherwise, a portion of the conductor will be under one zone of flux, and the other under the opposite flux. The number of armature turns between commutator segments must be kept low, to prevent a high reactance voltage, with destructive sparking.

Heating Results from Losses

Heating is a natural result of losses, and is dependent upon the ratio between these losses and the amount of external generator surface from which they are dissipated. A balance must be maintained between these factors so as to obtain the best proportions.

The machine must also be capable of maintaining moderate overloads for short periods of time without injury to the windings, and here the designer must allow a certain factor of safety. As a matter of fact, the demands of the automobile manufacturer have become so

great that it is only with difficulty that a unit can be designed with any margin of safety, as it is now customary to exact every possible watt output from the generator, regardless of the demands of the service. In this respect not only the generator, but the battery as well, suffers. The ability to sustain a small overload, say 25 per cent, is therefore one of insulation ability rather than one of capacity of the conductors. By properly treating the fibrous materials of which the insulations are made, they can withstand temperatures of over 100 deg. C. (212 deg. F) continuously, and in some cases even 150 deg. C. (302 deg. F.), although in the end their life is considerably shortened. In fact, in continuous service, such as is encountered on trucks and buses, the generators must be set for lower outputs than when used intermittently, as on passenger cars.

Stability

In addition to the above, the stability of the generator should be considered; that is, it is necessary that it possess leeway electrically such that its output will remain constant under identical conditions, over long periods of service. Under this heading, also, we will do well to include the means of adjustment for output—that is, the movement of the third brush relative to the main brushes. Too many designs are extremely sensitive to this factor, and it is difficult to adjust the output with any degree of assurance that it will remain as set. Usually, the third brush is canted on one edge when moved angularly, and as its surface wears in, the output will vary. To insure a stable design, the pole tip wings must be properly beveled off to present a magnetic field of gradually increasing intensity to the armature conductors. The neutral zone, that is, the non-magnetic space between the pole tips, should span at least one-third of the total pole pitch; i.e., the pole bore divided by the number of poles. Also, the spiralling of the armature teeth, which is done in some designs to reduce magnetic noise, should be less than the width of the neutral zone. Careful consideration of the limitations of these three points will give the foundation of a correctly principled design.

This phase of generator design is quite often considered of minor importance, as compared with the desired



Automobile type generator with third brush regulation

electrical features, and it is very likely to be neglected in favor of the latter. While it is true to a certain extent that the electrical characteristics are more likely to be under the direct observation and criticism of the car operator, yet it is just as essential that the machine operate correctly mechanically; otherwise the electrical performance will also be impaired.

The bearings present probably one of the greatest problems, for these really determine the ability of the armature to run freely, and it is essential that they be

not only quiet and of long life, but the matter of their proper lubrication is an important factor. Care must also be taken, however, not to provide over-lubrication; otherwise the oil will get into the generator proper and damage the windings.

Bearings are divided into two distinct types: namely—(1) the plain or sleeve type, and (2) ball bearings.

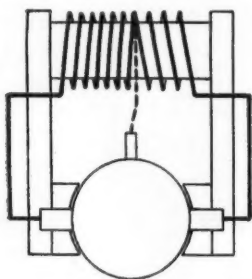
Plain bearings are inherently quiet, and the designer's problem is confined to the selection of proper materials, the correct dimensional proportions between the diameter and the lateral length, and finally—the lubrication.

Selection of Material

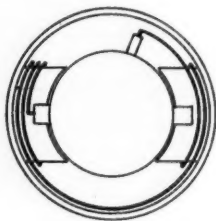
The selection of materials has, to a certain extent, been reduced to common practice as the result of experience. On the other hand, available space almost completely dominates the length of the bearing, since the amount of room allocated to the generator by the car manufacturer is often times very limited.

Lubrication depends entirely on the type of mounting, i.e., flange or foot. In the flange type the driving bearing receives its supply from the engine gear case. This supply varies widely, not only with the speed, temperature and oil level of an individual engine, but also between engines of various makes. For best results the bearing should therefore be designed to take as much oil as the engine gives, at the same time clearing itself to prevent the oil from working back into the generator proper. A suitable baffle scheme must be provided, to prevent oil vapor being forced into the generator by the breathing action which occurs in the crank case. The self-lubricated bearings are usually taken care of by wick cup oilers, with provision for additional oil being supplied whenever necessary.

Ball bearing problems are more of a mechanical nature and consist of proper fits on the armature shaft and in the bracket housing, so as to prevent either cramping of the balls or excessive creeping. A baffle system is also required to prevent oil and vapor from being drawn through the bearings into the generator, as in the case of the plain bearing. Great care must be exercised in mounting ball bearings, that they be free from foreign matter in the nature of grit or chips; otherwise, a grinding action sets in which soon wears the bearing out. Thus, the problem of proper bearing design plays a very important part in the whole schedule.



(Left) Diagram of Tesla third brush regulation.
(Right) Modern third brush regulation, automobile type

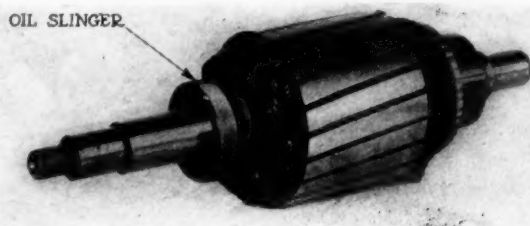


Another point of no less importance is the brush holder, for unless this is of rugged construction, trouble is sure to develop. It must be heavy enough to carry away the heat of the brush, rigid enough to withstand vibration and maintain the output settings, and of such design that the brushes are accessible and interchangeable. It would also be a desired feature, if possible, to provide for spring adjustments, so that the pressure of the brush on the commutator be varied as required.

The third brush holder adjustment is worthy of the

most serious consideration. It has been debated for some time whether it is desirable to make this adjustment easy or difficult. Much has been advanced for both sides, but the trend of opinion seems to be toward making the provision for doing this an easy operation, and to have the means in an accessible position. It should not, however, be possible for one to adjust past the same output point of the machine; otherwise there is every likelihood of damage ensuing. The adjustment should be positive, and means for rigid clamping should be provided.

The commutator offers a fertile field for investigation, since it is necessary that this part of the unit be both electrically and mechanically strong, and at the



Armature of generator

same time capable of being produced at a minimum of cost.

The shop end of the generator problem presents one of the most involved sides, for unless the machine can be manufactured readily and cheaply, the finest technique of either the electrical or mechanical engineer becomes of little value other than an interesting laboratory experiment. Hence it is impossible to consider the technical side without the manufacture also receiving its proper share of attention. While it is, of course, necessary for the producing departments to adhere to fairly rigid mechanical dimensions, nevertheless the design must be such that liberal allowances can be made. There is little to be said in favor of a machine which on test will prove extremely sensitive, and in which the slightest variation of an element will cause it to be rejected. It must be possible for the shop to assemble material at random and not be confined to the art of selecting and fitting individual parts, in order to meet the specifications. It must not be understood that we wish to appear as condoning inferior workmanship, but rather trying to guard against the unnecessary expenditure of labor and materials.

Reduction in Number of Units

In order to reduce manufacturing costs to the lowest possible basis, it is desirable to confine the number of units, varying only by a slight difference, to a minimum. If it were possible, for instance, to have all armatures (and especially their shaft extensions) the same, it would then be permissible to stock these ahead during dull periods, thus holding the trained organizations intact. At the same time the speed with which the car manufacturer could be served in his rush periods would be greatly increased. Furthermore, a reduction in costs would follow, since the overhead expense would be maintained at an even percentage, and wastage and spoilage held to a minimum by reason of the efficiency of the operators.

This same line of reasoning can be applied to the frame, poles and coil assembly, such that the same unit may be used for either direction of rotation or any desired type of mounting (flange, foot, band, etc.). The variety of units must also be held to a minimum, for equipment and production reasons. This will also greatly affect the amount of raw material required to be carried in advance, which also has a marked influence on

overhead charges and delivery dates. At the present time special attention is being given toward the attainment of this ideal by committees of both the Society of Automotive Engineers and the Automotive Electric Association, working jointly. The greatest drawback to the ready adoption of this recognized advantage is the matter of service of equipment on engines already manufactured. Many engine builders prefer to continue with their present designs, instead of bringing out a changed model solely for the benefit of the electrical equipment manufacturer. Probably the simplest method and one which will finally be adopted, will be to bear with the situation as regards present designs, but to obtain the co-operation of both the engine builders and automobile manufacturers, such that new designs of engines will utilize standardized electrical equipment.

The design of parts to permit adjustment at the factory will also tend to reduce the cost of production, since by this means greater freedom as regards settings is obtained.

Insulation

The matter of insulation and the proper value of applied voltage to ground for proving its strength is a subject for considerable discussion. It is a problem to decide where to draw the line. Naturally, it is best to provide as much insulation as possible; yet considering that we are working with exceedingly low voltages, very slight electrical insulation is required and the subject becomes one of the mechanical strength required by service and manufacturing. Too much insulation is a waste of both space and material, while lack of a sufficient quantity will cause the car owner future expense and trouble. The problem then becomes one of making the best and most judicious use of the materials. Current practice dictates the use of fish paper cells in the armature slots and single cotton covered enamel wire for the conductors, with cotton sleeving around the commutator connectors. Some manufacturers also place insulation strips between individual coils where the end turns overlap. The field coils are wound with either enameled wire or wire having a single cotton insulation covering. The whole coil is then covered with cotton tape, which serves to mechanically hold the coil together and as a protection against electrical grounds. Both armature and field coils are further subjected to a varnish treatment, which serves to securely bind the conductors together and to exclude moisture. Another purpose of the varnish treatment is to provide a heat conductor, since the varnish fills in all interstices be-

tween the wires and will conduct away the heat at a faster rate than air. Also, it acts as a preservative for the fibrous materials, preventing a too rapid deterioration due to the great heating to which they are subjected.

Commercial Testing

Commercial testing consists of deciding to what extent the units must be proven at the factory before shipment. Just how this can be performed quickly and sufficiently rigidly to determine their probable ability to successfully perform on the automobile is one of the engineer's functions. It is necessary to reduce the time of this operation to a minimum, in order to not hold completed units when they are required, or to necessitate abnormal expenditures for factory equipment. This is accomplished to some extent by introducing a rigid system of checks on the individual component parts as they are being brought through various stages of manufacture. In fact, these parts are checked usually after each operation, so that by the time they reach the assembly section all defective parts have been eliminated. The assembled generator is then given a run under operating load until all parts have thoroughly heated up, so that any defect not readily found in the tests of the component parts will be brought out.

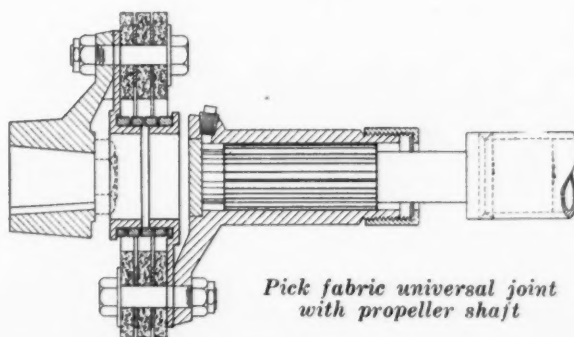
Problem of Service

The last, but by no means the least of the points to be considered, is that of service; i.e., the matter of repair and replacement. This, of course, is closely co-ordinated with the manufacture. It is essential to reduce the number of parts which must be carried in stock by service stations, and by so doing the greatest amount of general service can be rendered. Parts must be accessible for quick and easy repair, and in this way the expense of necessary replacements kept down. Perhaps, in summing up, it might be stated that the greatest problem in building a generator is to construct one which will need no service other than that necessitated by legitimate wear.

COMMERCIAL melting practice for aluminum and its light alloys has been studied in a preliminary way by the Bureau of Mines. The purpose of this investigation is to ascertain the metal and fuel losses in melting aluminum and its light alloys in the United States, and to determine the preferable methods of melting. A preliminary report, to be issued as a bulletin, has been prepared, and a complete report will be issued later.

Fabric Universal Joint with New Features

TWO uncommon features are embodied in the fabric type of universal joint manufactured by the Carl Pick Co. One of these is a slip shaft connection which gives protection against end thrust, telescoping of disks and undue loads on bearings, and at the same time simplifies the assembling operation. The other feature is a centering device, which is recommended particularly for speed truck jobs and permits of holding the propeller shaft in alignment at all times. In this design the fabric disks take only the torque, all other strains being provided for elsewhere. These fabric universal joints are made in four sizes, covering the commercial field from the light delivery wagon to the 3½-ton truck.



Pick fabric universal joint
with propeller shaft

New Cylinder Grinder Features Vertical Spindle

Radical departure from horizontal type. Mounting of mechanism above grinding wheel claimed to remove dangers from abrasive dust. All necessary power furnished by a 2 hp. electric motor.

CYLINDER grinders heretofore have been generally of the horizontal-spindle type, and the development of a vertical-spindle grinder, known as the Williams, by the Hy-Way Service Co., therefore marks a new departure in this particular branch of machine-tool engineering.

Several advantages are claimed for the vertical construction, the most important probably being that, since all of the mechanism is located above the grinding wheel, there is no danger of any of the abrasive dust finding its way into the bearings and other running parts of the machine. The ways on the vertical column on which the grinding-wheel head slides are protected by a canvas curtain.

The longitudinal table slide has sufficient movement in either direction from the center to provide for positioning the spindle for grinding three cylinders to each side of the center, without uncovering the ways of the slide, hence these ways also are protected against damage by abrasive dust. In setting up for grinding any particular size of cylinder, the bed on which the work table is mounted is set in approximately the correct position to locate the work under the grinding wheel properly. A final adjustment is then made by means of a cross slide controlled by the screw and crank seen near the base of the machine at the front.

All of the mechanism of the Williams cylinder grinder is carried by the wheel head. The drive is by individual electric motor, a 2-hp. G. E. motor being mounted at the back of the head. There are three functions which must be performed by the power from this motor, as follows:

- 1—Driving the grinding spindle at the high speed necessary for the abrasive wheel to cut efficiently.
- 2—Transmitting the planetary motion to the spindle unit.
- 3—Feeding the head down in order to advance the grinding wheel into the cylinder and then returning it to the starting point.

From the side view of the machine it may be seen that the electric motor is provided with a double-end drive. At the top there is a pulley which carries a fabric belt by means of which power is transmitted direct to the grinding spindle. In this way the high speed of rotation

of the motor is utilized to give the required cutting speed for the abrasive wheel, the correct speeds for various sizes of wheels being obtained by the use of suitable pulley ratios. It is claimed that owing to the use of a direct drive, ample power is secured from a 2-hp. motor.

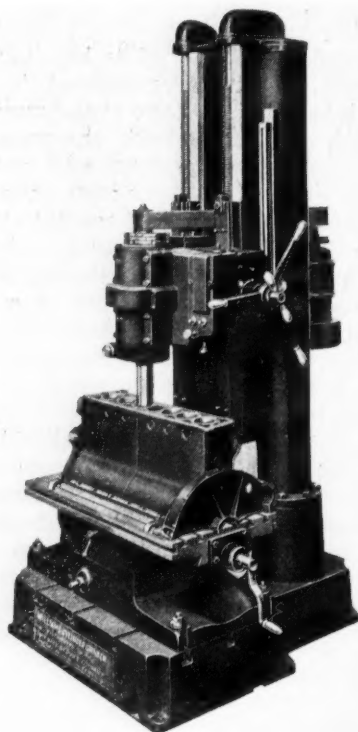
The spindle of the abrasive wheel is mounted in a sleeve which, in turn, is eccentrically located within a second-sleeve member, on which there is a ring bevel gear to which power is transmitted for rotating the wheel unit independently of the rotation of the grinding spindle.

The two cylindrical members which constitute the grinding spindle mounting are arranged in such a way that by making suitable adjustments the eccentricity of the grinding spindle in relation to the entire spindle unit may be varied from zero up to $1\frac{1}{8}$ -in. A graduated dial is provided to indicate the eccentricity for any given setting. This is ample to provide for all commercial sizes of automotive cylinders where grinding wheels of suitable size are employed for the various jobs, without the necessity of changing pulley sizes.

Power for the planetary movement to the grinding head is taken from a helical pinion at the lower end of the electric motor and carried through a suitable train of helical, bevel and spur gears to a pinion that meshes with the ring bevel gear on the grinding spindle unit. For different jobs it is desirable to have a selection of speeds of rotation for the spindle unit, and this is accomplished by the use of the two spur gears, both of which are mounted on the shaft carrying the pinion that meshes with the ring bevel gear. Between these two gears there is a clutch member operated by means of the hand lever (left side), and by the manipulation of this lever a speed of either 40 or 60 r.p.m. may be imparted to the planetary movement.

Feed and the Reverse Movements

The Williams cylinder grinder is furnished with a range of feed changes, so that provision may be made for advancing the grinding wheel into the cylinder at twelve different rates of feed, according to the job which is being handled. After the grinding wheel has been advanced to the desired point, the feed is reversed, in order to carry the grinding wheel and its head back to the starting position.



*Williams cylinder grinder
with cylinder block in position
on work table*

On the shaft which transmits power through the planetary movement of the spindle unit, there is another bevel gear which transmits power through the feed box, by means of which three changes of speed are obtained. This box consists of two cones of three gears, all of which are in mesh, and by means of a plunger a diving key is manipulated to provide for driving through the desired pair of gears.

At the end of the shaft carrying the second of these two cones of gears there is a bevel pinion meshing with the familiar arrangement of two bevel gears loosely mounted on a vertical shaft, with a clutch member between the gears, so that either one may be secured to the shaft for feeding the grinding head down or raising it. This reversal of movement of the head is automatically accomplished by means of stops on the column, which trip the clutch just referred to. There is a small plunger under the gear box, which may be manipulated by hand to reverse the direction of feed.

At the lower end of the vertical shaft carrying the two bevel gears and the clutch, there is a second bevel gear which drives a horizontal jack shaft. Two spur gears on this shaft transmit power to a parallel shaft, and by means of a clutch member operated by a plunger, either of these two gears may be engaged to provide for transmitting power at either of two specified rates. This multiplies by two the three changes obtained through the cones of gears; and a second multiplication is obtained by the two changes accomplished by gears

manipulated by a lever (left side), making a total of twelve available rates of feed, ranging from 0.007 in. to 0.375 in. per revolution of the grinding spindle.

Feeding the head up and down on the column of the machine is accomplished by means of pinions meshing with the racks. Power is taken from the horizontal shaft through a worm to a worm wheel carried by the cross shaft, on which are mounted the pinions that mesh with the racks on the column. At the right hand end of this cross shaft there is a capstan wheel that permits of raising or lowering the grinding head by hand.

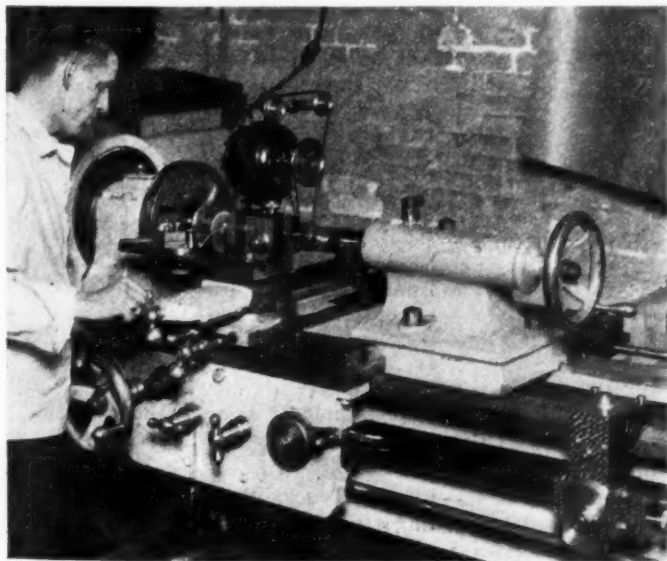
Function of the Capstan Wheel

This wheel is furnished with a clutch that engages the worm wheel on the cross shaft, and when this clutch locks the worm wheel to the shaft, the capstan wheel is inoperative, because it would involve turning the mechanism of the entire machine by hand; but when the clutch is released so that the worm wheel is loose on its shaft, it is merely necessary for the man to turn the capstan wheel to rotate the pinions in mesh with the racks on the column of the machine and moving the grinding head up or down as required. All of the mechanism of this feed box runs in a bath of oil.

Arrangements for the manufacture of this grinder have been made with the Foster Machine Co. who, we are informed, will go into immediate production on it. The distribution of the machine will be looked after by the Hy-Way Service Co.

Grinding Attachment for Lathe

A GRINDING attachment for a lathe that is particularly useful in the tool room has been brought out by the Precision and Thread Grinder Mfg. Co. It is known as a multi-graduated precision grinder and clamps upon the top of the lathe tool rest. It is made in two models, one for lathes equipped with back tool rest and the other for ordinary lathes. The grinder is adapted for grinding thread gages, taps, dies, chasers, thread rolling dies, hardened worms, thread milling hobs and thread molding dies and also for internal grinding up to a depth of 12 in.



Lathe fitted with thread grinder and precision lead variator

The same concern also manufactures a precision thread lead variator which is claimed to make it possible to obtain a precision lead from the ordinary lathe lead screw, and to elongate the lead on parts which are subsequently to be hardened, to compensate for shrinkage. This eliminates correction grinding in non-precision work and reduces it in precision work. In the illustration the grinder and thread lead variator are shown applied to a lathe and in operation.

Single Track Car Uses Little Fuel

IN connection with the European tendency to develop cars that are more economical in operation, a certain amount of interest attaches to a so-called single track car just brought out in Germany. It was designed by Reinhold Boehm, who held the duration flight record from 1913 to 1920, and is to be manufactured by the Mauser A. G. in Oberndorf, an old gun factory. Generally speaking, the machine is of the motorcycle type, but provides a completely enclosed seat for the operator. To hold it in the upright position when at rest, two supporting wheels are provided at the sides which can be let down as the machine comes to rest and raised up when starting off. The engine is a two-cylinder opposed, rated at 6 hp. at 3000 r.p.m., and is built by the Bayerische Motoren Werke. The regular wheels carry 26 by 3 in. tires, the supporting wheels 15 by 2½ in. The wheelbase is 75 in., the weight 330 lb. The fuel capacity is 17 quarts, the fuel consumption 1 gal. per 67 miles and the maximum speed 40 m.p.h. In dense traffic the machine can be used as a three-track vehicle by letting the supporting wheels down. An auxiliary seat is provided for a passenger.

Helping Tractor Sales and Service by Conducting Dealer Schools

Dealers welcome power farming instruction given by tractor manufacturers' schools. Proves valuable in bringing dealers, customers and company together and decreases calls for service help. Laboratory work imparts thorough knowledge of product.

DEVELOPING and maintaining an efficient dealer organization is one of the most important problems confronting the tractor manufacturer. While it has been, and still is, the policy of some companies to sell direct to certain industrial fields and territories where for one reason or another they have no dealer representation, the dealer is recognized as the logical sales outlet.

Manufacturers are endeavoring to strengthen their retail connections but the methods used to attain this end vary widely in their fundamental conception and details. There is a universal attempt to select the best dealers possible but after the contract is signed some manufacturers leave the dealer to his own initiative in developing sales, depending on "pep" literature and meetings to supply the necessary force in maintaining morale.

Many manufacturers, in addition, go to considerable effort and expense to instruct dealers in the details of mechanical construction, methods of locating prospects, closing sales and rendering service. It is a question just how far a manufacturer can go to develop the dealer organization and it is one in which the trade is vitally interested.

During the winter season for the past four years, the Advance-Rumely Thresher Co., Inc. has been conducting dealer schools with marked success. For three years these schools were held at the home office, but this form of educational work proved so valuable that last winter schools of one week in length were held at ten branches in addition to the home office school.

Knowledge of Product, the Best Selling Asset

The fundamental idea behind these schools is to so instruct the dealer that he knows thoroughly the products which he is selling. Richard Spillane, writing recently in the *Philadelphia Public Ledger*, expressed the idea aptly by telling the following story:

"Hugh Chalmers, who was a big figure in the National Cash Register Company before he entered the automobile field, says the greatest speech on salesmanship he ever heard was in Berlin. Incidental to a trip abroad, he visited the general agencies of the cash register company and addressed a gathering of their salesmen of the German Empire. One salesman, who had been extraordinarily successful, also was to address the audience explaining how he did it.

"When the salesman was introduced Mr. Chalmers was astonished to see in him a man more of the workman than the salesman type. The successful salesman opened his mouth once or twice and said nothing, shifted his position two or three times and became more and more troubled. Then suddenly extending his arms as if in appeal to his

hearers to judge him kindly, he blurted out: 'I do not know how to make a speech, but I know the cash register better than the man who invented it.' Then he left the platform.

"Mr. Chalmers says it was the most impressive address on selling he ever heard."

The Rumely company has built its dealer schools on exactly this idea. It believes that the first and most important step in selling is for its dealers to know the products in detail. Relatively little straight "sales talk" is included on the program. Two-thirds of the time is spent in the laboratory where those in attendance work under the direction of competent instructors. The lectures deal mainly with construction and operation and are closely correlated to the laboratory work. At each school a professor from the Agricultural Engineering Department of the State university gives a lecture dealing with the place of the tractor in agriculture. Entertainment features are not neglected. Following is a typical program, although at the branches the trip through the factory must be omitted:

Monday

Forenoon—Registration and trip through the factory.

1:30-2:30 *p. m.*—Introductory remarks. Lecture—Principles of the Gas Engine. Valves and Valve Timing. G. W. Iverson.

2:30-4:30 *p. m.*—Laboratory.

7:00-9:00 *p. m.*—Smoker and Get-together. Chairman, Finley P. Mount, President Advance-Rumely Co.

Address of Welcome. Warren T. McCray, Governor of Indiana.

The Place of the Tractor in the Corn Belt. Prof. G. W. McCuen, Ohio State University.

Tuesday

9:00-10:00 *a. m.*—Fuels and Carburetion. J. A. Secor, Chief Consulting Engineer, Advance-Rumely Co.

10:00-12:00 *a. m.*—Laboratory.

1:30-2:30 *p. m.*—Lecture—Triple Heat Control. G. W. Iverson.

2:30-4:30 *p. m.*—Laboratory.

7:30-9:00 *p. m.*—Entertainment, K. of C. Club Rooms.

Wednesday

9:00-11:30 *a. m.*—Rumely Truck. F. P. Shortle.

1:30-2:30 *p. m.*—Importance of Lubrication. Representative Vacuum Oil Co.

Tests on Lubricating Oils. S. F. Lentz, Texas Co.

Oil Pull Lubrication. G. W. Iverson.

2:30-3:30 p. m.—Laboratory.
Lubrication. R. W. Carrington,
Standard Oil Co.
7:00-8:30 p. m.—Advance-Rumely Movie.
Value of Advertising. W. B. Henri,
Henri, Hurst & McDonald.

Thursday

9:00-10:00 a. m.—Gear Lubrication. Representative
Ironsides Co.
Care and Operation of the Tractor.
G. W. Iverson.
10:00-12:00 a. m.—Laboratory.
1:30-2:30 p. m.—Tractor Ignition. J. L. Snyder,
American Bosch Magneto Corp.
2:30-4:30 p. m.—Laboratory.

Friday

9:00-10:00 a. m.—The Ideal Separator. A. J. Knapp.
10:00-12:00 a. m.—Laboratory.
1:30-3:30 p. m.—Laboratory.
3:30-4:30 p. m.—Product
and Policy.
J. Abrams,
Sales Man-
ager.
6:30 p. m.—Banquet. Finley
P. Mount, Toast-
master.

It requires two railroad cars to transport the material consisting of engines, transmissions, models, ignition equipment, tools, charts, etc., used at each school. There are two sets of this equipment. While one set is in use the other is being transported to and set up at a new location. Everything is planned out in advance with the idea of keeping the students busy from the time they arrive until the end of the banquet.

One laboratory instructor is provided for ten students. A laboratory manual and general instruction book are issued to each student when he registers. These printed instructions give the directions for each laboratory exercise together with a set of questions designed to stimulate the student's interest and to cause him to dig for important points.

Most of the instructors are service men at the different branches although frequently students who are attending for the second or third time are used in this role. Aside from the lecturers the crew which makes all the schools consists of a general manager, director of the laboratory work, magneto man and truck man. Frequently some of the laboratory instructors are taken from one branch to the next to avoid having an entirely new crew, but these men are never taken far from their original headquarters. In addition to this staff there is an advance man who is engaged in setting up the equipment for the next school.

There has been a total attendance of 2400 students at these schools in the four years of their existence. Last winter the attendance was 1161, consisting of 654 dealers, 417 customers and 90 salesmen. One branch manager expressed his opinion of the schools in the following manner:

"There are several things that appeal to us as of more importance than any other thing in connection with the school. One is that the personal acquaintance obtained by our organization with the customers and dealers is a thing of lasting value to both the company and the trade.

This personal acquaintance creates a loyalty that will never be destroyed. Another observation we have made, and one that impressed us very much, was to have new dealers and customers say to us that hereafter they would always believe anything that might be contained in our catalogs and literature. After having an opportunity to work upon our product they knew that the representations made in our literature were based on facts. This was expressed by a large number of new customers and dealers who had not had an opportunity to attend any of our previous schools."

The admittance of customers other than dealers, besides making better operators and stronger friends for the company, had an effect which was not anticipated. Many of these customers who had ordered for spring or early summer delivery decided, after attending the school, that there was no advantage in further waiting and ordered immediate delivery so as to become better

acquainted with the tractor and work it in gradually before the heavy work started. These customers left the school well started on the road to becoming successful power farmers because they had taken the first step in the right direction; they knew the tractor and how to care for it.

The schools have already exerted a marked influence in solving the service problem. It has been found that the customers who attended seldom call upon the dealer for help and what is of equal importance, dealers who have attended are able to take care of an increas-

ing amount of their service work without calling on the branches for help. The calls from school dealers for service help on the part of the branch have decreased so rapidly that some branches have already reduced their service forces. While the full effects of the work of these schools on the service problems of the company have not yet been realized the results are pronounced enough to indicate that the reduced cost of furnishing service will be no small item in covering the expense of the undertaking.

This form of sales and service promotion work is appreciated by the dealers. Eighty per cent of those in territories where schools have been held have taken the course. Thirty per cent of these dealers have attended a second time while in many cases other members of the sales and service force attend the second, third and fourth years. The dealers have arrived at a point where they look forward to this annual event.

It is difficult to estimate the full value of this form of educational work for it touches the trade at many points. The students undoubtedly take away a large amount of specific information which is fundamental to the rapid spread of power farming. The dealers become acquainted with the men and policies of the company. The officials of the company secure first-hand information regarding the problems of the dealers. The personal acquaintances made between members of different groups in the trade has a lasting value. The Advance-Rumely Co. believes that these schools were an important factor in keeping its factory running every day during the recent readjustment and is planning to enter the coming winter with a larger school program than ever before.

THIS story tells how one company conducts its tractor school for dealers and customers. It outlines a typical schedule by which instruction is concentrated into a week's course and relates some of the benefits which have accrued to dealers, customers and the company alike.

The fundamental idea back of this tractor school is to give the dealer a thorough working knowledge of the product and thus secure greater sales and better service. How well the idea works out may be gathered from the story.

New Device Permits Studying Motion of High Speed Machine Parts

Gives reproduction of movement at speed reduction of 100 to 1, or stationary image of part in any point in cycle of operation. Periodicity and amplitude of vibration may be determined and causes traced. Applicable to many automotive engineering problems.

IN the development of high speed engines irregularities in operation are often observed which are difficult to explain and analyze, for want of a suitable means of investigation. Various stroboscopic apparatuses have been devised for this purpose, most of which use a flexible shaft for operating rotating shutters. A device known as the Elverson Oscilloscope has been developed in England and is based on the principle of the persistence of the image of an object produced by a momentary flash of light.

The Oscilloscope can be used in two ways, namely, so as to give an accurate reproduction of the motion of any high speed machine part at a speed reduction of 100 to 1, or to give a stationary image of the relative position of any parts at any speed and for any particular point in the cycle of their operation. The principle of the device is exceedingly simple. Use is made of a flash lamp consisting of a bulb filled with neon gas which is lit up by means of an electric discharge between conductors within it, brought about by an interrupter actuated directly from the mechanism to be investigated. The neon lamp is said to have an exceedingly small-time lag; that is, practically no time elapses between the moment the electric contact is made and the moment the lamp attains its full brilliancy. When operated in the stationary position contact is made once per cycle of the mechanism to be investigated, always at exactly the same point in the cycle.

OWING to the persistence of the image, the observer apparently sees the mechanism at a standstill in the correct position or relationship for the point of the cycle in question. What he sees is not how the parts are related and what shapes they assume when the mechanism is at rest, but the relationships and forms of the parts at the speed of operation for the particular point of the cycle investigated.

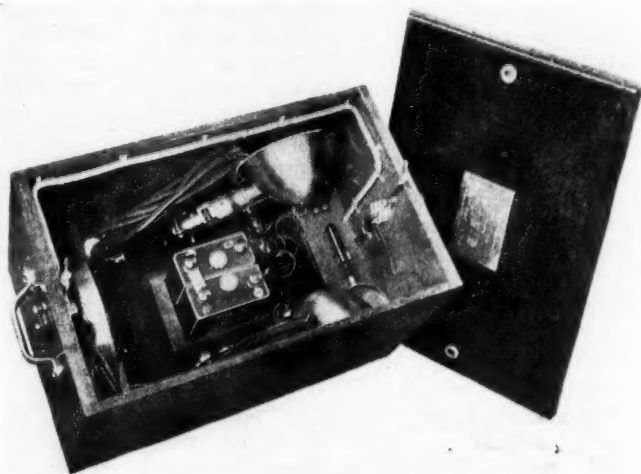
The interrupter, of course, must be mechanically connected to the mechanism to be investigated and the lamp brought into a position where it illuminates those particular parts whose motion or change in shape under the forces of operation is to be studied. As will be seen from the illustration herewith, the lamp is provided with a reflector, so as to increase the intensity of illumination, but in cramped spaces, as, for instance, in engine crankcases, it can be used without the reflector. Tests must be made in subdued light, but complete darkness is not essential. After the relationships at one point of the cycle have been investigated the interrupter may be shifted to investigate another point and the angular or

linear displacement of the two points can be accurately determined. If necessary good photographs of the parts may be taken.

IN the other position of the apparatus, known as the creeping position, supposing the part to be investigated to have a rotary motion, the interruption of the electric circuit is made to occur at a point 3.6 deg. further on in the cycle during each succeeding cycle. This effect is obtained by the use of two gears with 99 and 100 teeth respectively. The result is that the actual cycle of operations is displayed before the eyes of the observer at one-hundredth the actual speed.

It is obvious that one of the problems in automotive engineering to the study of which the apparatus lends itself is that of the motion of valve mechanism. It is stated that observations with the instrument have shown that with some forms of valve gear the valve after climbing the cam incline will bounce three or four times before coming to rest, while single or double bounces are very common.

The outfit comprises two slides, which enable the operator to produce one, two or four flashes per revolution. It is evident that the higher the speed the better will be the image. In cases where it is more convenient to drive from a shaft running at a fraction of mainshaft speed, at very low speeds, with a single flash per revolution the image has a tendency to be discontinuous, and this can be remedied by producing either two or four flashes per revolution. There is, however, another object in provid-



Elverson Oscilloscope in portable case

ing means for producing more than one flash per revolution. Suppose that a case of vibration is to be analyzed and the periodicity and amplitude of the vibration are to be determined. If the vibration is synchronous with the shaft speed the vibrating part will appear to be slowly swaying to and fro. After the vibrating part has been observed with a single flash per revolution, two flashes per revolution are produced, and if a double image is then seen it proves that the vibration is synchronous with the shaft. On the other hand, if the double image appears only with four flashes per revolution, then the vibration occurs twice for every revolution of the shaft. If such a vibrating object is observed with the apparatus in the stationary position, two images will be seen, and as the apparatus is angularly advanced by hand, these images will recede and approach each other. Their maximum distance apart is a measure of the amplitude of the vibration.

A PECULIAR action in valve gear that has been observed with the instrument is surging of the valve springs. That is, the spring will leave its supporting surface, and in extreme cases it may even be seen floating in the air for an instant. Valves have also been seen coming down on their seat at a slant and then adjust themselves. Where a rocker arm works directly on the valve stem and is so designed as to produce considerable side pressure, the stem may be observed flexing and then snapping back again at every opening of the valve. By cutting away a portion of the crankcase and exposing the

cams, it is possible to study the motion of the cam followers and find out at which end any irregularity in the valve action starts. It is thus possible to draw a curve of actual valve lift against angular motion of camshaft or piston position and compare it with the theoretical or desired curve.

THE action of magneto contact breakers at high speed can also be investigated with the aid of this instrument. In connection with magnetos it has been found that certain types of flexible couplings produce a decided lag, and this lag can be measured. On aircraft engines the cylinder heads are said to have been observed "breathing" under the explosion impulses. Chain drives for camshafts, etc., can be investigated as to their regularity of transmission and vibrations can be traced to their sources. In lubrication problems it is possible to trace the exact distribution of lubricant on fast-moving parts.

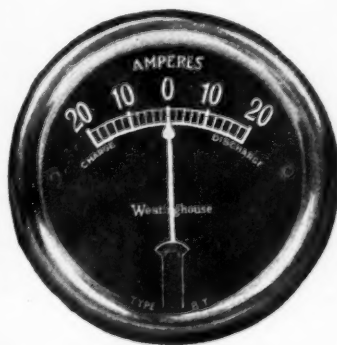
A most interesting study is that of the influence of engine vibration on aircraft fuselages, and we are informed that under this influence the fibers of the ash members can actually be seen opening up and shutting.

The apparatus described is manufactured in England by Herbert Kennedy & Co., Ltd., and is at present being demonstrated in this country by Peter Davey. Among others, a demonstration was given at the plant of the Wright Aeronautical Corp. in Paterson, N. J., on the standard Wright eight-cylinder aircraft engine, bearing on valve action, vibration, magneto drive, etc., at speeds up to 1800 r.p.m.

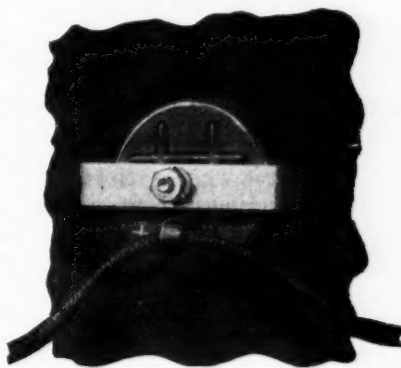
New Automobile Ammeter of Simplified Construction

AN automobile ammeter without electric coils or connections has been developed by the Westinghouse Electric & Mfg. Co.

The design of this ammeter, known as type BT, involves a radical departure from the principles used in all previous ammeters, in that no wire connections or coils are used. The case of the instrument has a magnetic yoke or loop projecting to the rear, through which is passed the current carrying cable or wire, which functions as a coil. The yoke has pole pieces extending into the inside of the ammeter. These poles vary in magnetic polarity and strength, corresponding to the direction and strength of the current passing through the wire and, being made of a special alloy steel, act without any residual magnetism error which would change the zero of the instrument. There is also a fixed permanent magnet inside the instrument, with poles located at right angles to the poles formed by the yoke. Pivoted on a shaft in the center of this group of poles is a soft iron vane which takes up a position corresponding to the relative strengths of the permanent and electro-magnetic poles. The shaft carries the usual pointer which indicates the value of the current on a dial. The movement is so balanced that car shocks or swaying will not cause the pointer to swing, it is claimed.



Westinghouse type BT
ammeter



Rear view of ammeter on
dashboard, showing battery
cable passing through yoke

sible by the development in the Westinghouse laboratories of the new non-residual steel alloy, reduces by more than 50 per cent the number of necessary parts and facilitates installation on the car by means of two pieces of wire or cable with connections and clips, the only operation necessary is to pass the dashboard cable through the opening in the back of the

instrument. Other advantages claimed are that all possibility of ground is eliminated, there can be no short circuits or burn-outs and overload will not injure the meter.

AMERICAN exporters of automotive products should exert the utmost care in the terms used in their catalogues printed in foreign languages. Instances have come to the attention of the Automotive Division of the Bureau of Foreign and Domestic Commerce where prominent automotive exporters have done a great deal of harm to the reputation of their first class product in foreign territories by distributing catalogues containing descriptive adjectives and nouns which could not but convey a very unfavorable impression, owing to the fact that in the different countries these words would apply only to products of an inferior standing and quality or are not used at all.

Scandinavian Nations Now Good Market for American Cars

Buying public favors our product. Recently lowered freight rates permit competition with European manufacturers. Extension of credit facilities and modification of sales policy needed. Large war stocks on hand keep market for heavy trucks dormant.

By Birger Jacobsson

NORWAY, Sweden, Denmark and Finland, together termed the Scandinavian countries, are at the present time very good customers of American cars and trucks, and it is expected that the number of American cars imported to these countries will more than double when the Finnish and Norwegian monetary exchange rates become more favorable.

Before the outbreak of the war imported American cars came via German ports. During the war dealers found it troublesome to import cars as the English embargo made it difficult in many ways beside the fact that tires had to be stripped off the cars.

The years 1919 and 1920 promised tremendous business, but the manufacturer's inability to fill orders proved a handicap. During 1921 the depression hit Scandinavia and importations of cars dropped to a minimum. Last winter the dealers began to see their opportunity and to-day we may regard one of the Scandinavian countries, namely Sweden, as a first rank customer of the United States. It is close to Mexico and Australia in the number of cars imported, though its population is little above the 5,000,000 mark and importations from Germany, Austria, Italy, France and England are by no means small.

KEEN competition with practically all European automobile producing countries makes an analysis of the Scandinavian market of special interest to American automotive manufacturers. The car buying public in these countries favors a light car with large engine. At the same time it is very particular as to the quality of the body. Its ideal would be the average American "light six" chassis equipped with the average European body.

During the past year a great many Austrian and German cars have been imported, but it is believed that this heavy importation has been influenced by the inexpensiveness of these cars on account of the ever depreciating rate of exchange of those countries, rather than by a desire to market them in the future.

American cars and trucks can now compete with any similar European product having a stabilized price, since heavy freight charges have been cut to a minimum. Two years ago the average freight cost to any of the Scandinavian ports of entry was as high as \$1.75 a cu. ft., which resulted in an abnormal freight charge of \$700 for the average light car as compared with a charge of \$120 to-day.

Custom duties in all Scandinavian countries are now being based on the cost of the car landed at the port of destination and this averages 12 to 15 per cent in Sweden, Norway and Denmark. Finland has a duty of 40 per cent for passenger cars and 10 per cent for trucks.

The dealer who is able to get all his car shipments from the factory between March and July is in the most advantageous position. There are, of course, cars sold during every month of the year, but at least 75 per cent of sales take place during the period mentioned. This selling period is de-

pendent upon the season to a very great extent.

Passenger cars which list at \$500 to \$1500 are the best sellers. The amount of business done in closed cars is very small compared with what it should be and it is, in most instances, heavy freight charges that have held business back. No doubt importation of sedans and coupes will increase now that freight charges have been lowered. Closed cars may be sold from July to Christmas, but the volume will only reach about 10 per cent of open car sales.

A leading automobile dealer in any one of the Scandinavian countries must possess considerable capital to be able to pull through the dull season. It is a very difficult matter to obtain the capital to pay for cars about four months prior to arrival and sell them, as the majority of the dealers do, on easy payment terms.

THE American manufacturer who can facilitate credit matters for his dealer is therefore sure to increase the volume of business considerably. The banks do not

AERICAN automotive products can be sold in increasing numbers in Scandinavia. General business conditions have improved. Freight rates have been materially reduced and good roads are being built.

This article, by Birger Jacobsson, tells about trade practice in Scandinavia, shows how the market should be cultivated and outlines the modifications needed in selling policy to improve merchandising methods.



This map shows where manufacturers ought to have representation for the proper distribution of automotive products in Scandinavia. The shaded areas surrounding each of the main distributing centers indicate the logical extent of territory for each center

seem to understand the importance of automobile financing and dealers find little or no assistance from their banking connections.

American manufacturers should deal with each country directly. They should have a general agent or distributor and his subagents or branches as follows:

Norway—General agent at Christiania.

Branches or subagents at Bergen, Trondhjem, Christiansand and Stavanger.

(If the general agent is located at Bergen he must have a branch at Christiania.)

Sweden—General agent at Stockholm.

Branches or subagents at Gothenburg, Malmo, Karlstad, Kalmar and Sundsvall.

(If the general agent is located at Gothenburg he must have a branch at Stockholm.)

Denmark—General agent at Copenhagen.

Branches or subagents at Aarhus, Odense and Aalborg.

Finland—General agent at Helsingfors.

Branches or subagents at Abo, Tammerfors, Vasa and Viborg.

The general territorial divisions are indicated on the map.

It is absolutely wrong to have the general agents located in the smaller towns or cities. Such an arrangement does not get the bulk of business that it should because the dealers cannot get adequate representation in the capital or in the larger cities.

The general agent should not handle competitive lines. Scandinavian dealers generally represent a number of manufacturers, American as well as European, and in most instances the lines are competitive. If the dealer concentrates on one or two makes he can secure a much greater turnover and can attend to service matters more efficiently.

For example, a leading dealer in one of the Scandinavian capitals is general agent for the following cars: Rolls Royce, Delage, Benz, Buick, Hupmobile, Anderson and Panhard, and in addition is the general agent for Panhard, Benz, Clydesdale and Denby trucks. This dealer has no doubt invested a considerable sum of money in spare parts to be able to give service to all these makes. He feels that he does not want to give up any of the agencies, having expended a lot of money and effort to introduce them into the market. He is sure that if he drops one of the lines another dealer will step in and capitalize on his work. This may sound very queer to the American manufacturer, but it is the way most of the dealers in Scandinavia feel.

Good Service Essential

The car-buying public is now awakening to the fact that it wants a car which it knows the dealer is able to service. The American manufacturer would do well to supply the dealer with only those parts for stock that he knows are subjected to wear and not let the dealer order parts from the catalog just as he chooses.

If the manufacturer is well represented in all the North European countries he would do well to establish some kind of service parts depot in England or Holland, or he may choose any one of the free ports at Copenhagen, Gothenburg or Stockholm. In this way the dealer in American cars may be able to compete with European cars. At present many an owner of an American car has to wait for months for necessary spare parts.

The market for trucks of one to three tons capacity is at the moment good. It must be remembered that new

road regulations are or will be in effect shortly whereby an extensive use of pneumatic tires is prescribed. Buses seating 20 passengers will also have a good market for years to come.

There is no longer a market of any importance for trucks of more than three-ton capacity for the Scandinavian countries have absorbed more heavy trucks than they need and there are hundreds of war trucks stored in ports and offered at prices as low as \$200 or so.

American trucks are favored and the majority of buyers now are asking for quality rather than a low price. Those who do want to buy inexpensively find a Ford dealer in every little city in the country.

The parliaments of the Scandinavian countries have been discussing roads. Sweden has started to rebuild most of its roads this year. Millions of kronas are spent on the Government road program and most of the workmen shut out of the factories are employed in that field. The rebuilding of roads will have its influence on the automobile market and in the majority of cases sales will be augmented.

Rapid Changes in Agents Unsound

Many an American manufacturer has lost prestige by making too many changes in general agents. A manufacturer who makes a new appointment too frequently on account of the fact that the volume of business secured the preceding year has not been satisfactory, will gain little confidence with dealers and the buying public. In many instances the dealer cannot be blamed for a small volume of business. He may have had trouble in getting shipments from the factory through on time or have suffered difficulties in other ways. It would in such instances pay the manufacturer to send his direct representative over to investigate before making a decision. It is a journey of less than two weeks and the representative is only a day's travel from any of the other agents in the Scandinavian countries.

Recently it has been decided to arrange an international automobile exhibition at Gothenburg during 1923. This will be the first large automobile show in any of the Scandinavian countries for the past eight years. The exhibition floor space will cover more than 10,000 sq. ft. It is expected that exhibitors will have free customs clearance, very much reduced freight charges to the exhibition and free return freight. The show will cover all types of cars, trucks and motorcycles.

Freight Rates to Hawaii Reduced

AN important change in the freight rates on automobiles, trucks, etc., shipped from the United States to Hawaiian Islands will soon be made, the transportation division of the U. S. Department of Commerce has been advised by the Trans-Continental Freight Bureau.

The present carload minimum weight of 10,000 pounds and rate of \$3.65 per 100 pounds will be changed to a minimum weight of 16,000 pounds on passenger cars and parts thereof, and a rate of \$3.15 per 100 pounds will apply.

A separate rate is provided for automobiles, freight, k.d., boxed; automobiles, chassis, freight or passenger cars, k.d., boxed, and tractors, k.d., boxed. On these commodities the minimum weight will be 20,000 pounds per carload and the rate \$3.05 per 100 pounds.

The changes will not be effective until the new tariffs are published, which, it is expected, will be within the next 60 days.

Automobile Air Resistance Measured in Wind Tunnel

Tests made at Zeppelin Works show that the air resistance of modern types of motor cars is materially less than would be concluded from coefficients found in engineering text books. Advantages to be derived from complete streamlining of cars.

AN investigation of the air resistance of automobiles with different types of body has been made in the large wind tunnel of the Zeppelin Works at Friedrichshafen, and the results are discussed in a recent article by P. Jaray in *Der Motorwagen*. Jaray found that the air resistance coefficient is smaller than has been generally assumed heretofore, even in the case of conventional type vehicles. Making use of the well-known formula for air resistance,

$$F = c A V^2,$$

where F is the resistance in pounds, c , a constant, A the forwardly projected area in square feet and V the speed of the car in miles per hour, the value of c has been given heretofore by different authors as ranging all the way from 0.00275 to 0.00420. Dr. Riedler in his book on the Scientific Determination of the Merits of Automobiles gives it as varying between 0.00318 and 0.00338. According to the Automobile Technical Handbook, 10th edition, and Hütte, 22d edition, its value is 0.00276, while according to tests made with large cars by E. H. Lockwood at Sheffield Scientific School, its value is 0.00291.

Jaray's experiments showed that for a conventional modern car with no unnecessary projecting parts (no top, no baggage on the outside, no boxes and cans on running boards, etc.), with disk wheels, the air resistance coefficient varies from 0.0023 to 0.00265. For a closed car (limousine) under the same conditions the value of the coefficient varies from 0.0017 to 0.0018. For a car with a boat type of body without fenders or with horizontal plane fenders, with disk wheels and small windshield (racing car) the value of the coefficient was determined to be from 0.00138 to 0.00143, while finally for an all streamline body the coefficient was only 0.00064.



Jaray's streamline body evolved from wind tunnel experiments

Jaray explains that the reason the coefficients given by others are somewhat higher than those found by him is undoubtedly that their experiments were conducted with less favorable types of body. Those tested in the wind tunnel were all of comparatively recent design. It is fairly obvious that a top of poor design from an aerodynamic point of view increases the air resistance materially. Of the cars subjected to tests in the wind tunnel some had no top, while in the case of those that had a top it generally was of such construction that when taken down it gave a form favorable to easy air flow. With the top raised, air resistance coefficients of 0.00318 to 0.00345 and even 0.0037 would have to be figured with, and, besides, the increase in the projected area due to the top would have to be taken into account.

Coefficient of Air Resistance

Jaray thinks that the fact that closed cars (limousines) have a lower coefficient of air resistance than open cars will come as a surprise to most automobile engineers, though it will be quite obvious to the specialist in aerodynamics. In consequence of the unequal projected areas of open and closed cars, the total air resistance is, moreover, substantially the same for conventional constructions, and it cannot be changed materially. Neither V-type radiators nor wedge-shaped windshields have any appreciable influence. Even a pointed or downward sloping form of the forward end of the body is of relatively small importance, as long as the fenders prevent smooth flow of the air around the body as a whole. Only the elimination of the fenders or their arrangement in the direction of the air stream results in a material reduction of the air resistance, but of by far the greatest importance is the elimination of wheel resistance.

What is probably most required is to get the upper part of the wheels out of the air currents, because, on account of its more rapid forward motion, it is subjected to substantially four times the air resistance which corresponds to the actual speed of the car, while, on the other hand, the lower part of the wheels is almost at a standstill relative to the air. Accurate experiments on this point, in which smooth disk wheels presumably would give better results than spoke wheels, are not yet at hand. In connection with stock cars this question is of little moment.

Jaray then makes numerous calculations of the saving in energy-expenditure in horsepower hours which can be effected by the use of streamline forms, under different conditions. The advantage of the streamline form is, of course, most important when driving against a strong head wind.



The FORUM



Dealers Object to Exclusive Factory Advertising Control

Standardized copy fails to take advantage of local situation. Dealer pays for part of campaign and should have something to say about material used. Much printed matter useless to dealer.

Editor, AUTOMOTIVE INDUSTRIES:

Changed advertising policies on the part of some factories may be a point of friction in the contact between the dealer and the factory. Several Western distributors in taking new contracts have found that the advertising policy has been practically taken out of their hands and that in the future they will be expected to run copy and material furnished by the factories rather than that which in their own judgment would bring them the greatest business.

The principal objection to much of the advertising furnished in the past is that it has been designed mainly to sell the car, and not the dealer and his organization, which many Pacific Coast dealers have used as the basis for most of their merchandising. One dealer expressed it as follows:

"Inasmuch as we are expected to contribute toward a factory designed advertising campaign, this campaign represents in part our money. It is not unreasonable for us to expect that we should have some voice in the scope of this campaign and particularly in its application.

"The past has proven that stereotyped advertising campaigns, as designed by routine copy experts, do not cover the ground. A test of this is simple. 'Take any standard magazine, clip from it all the automobile advertisements and without mentioning the name, read them to any person fairly well posted in the automobile trade. If this individual to whom the advertisements are read can tell which automobile is being sold by any of the copy, he is a wonder. Most of the copy harps on the subject of luxury, beauty, comfort and reliability to a point where the song of one is the song of all.

"Automobile history in the West is such that it is continually making news. This news is the kind of stuff that sells automobiles, and will do it far better and more impressively than the same old story of luxury, beauty,

comfort and reliability. Such facts as the following are news and form the basis of 'honest-to-God' merchandising.

"The Portland Chevrolet dealer in the first week after the appearance of the new model took more than two hundred orders for the new car.

"A local company buys \$150,000 worth of machines of one model for highway service."

Automobile dealers in the West feature different sales points than they do in the East. Oregon to-day has in the neighborhood of 2000 miles of paved roads and 40,000 miles of macadam and mountain trails. The paved roads have grades not to exceed 5 per cent, but the mountain roads try cars to the quick.

Not so many years ago a dealer having a splendid car in every respect, lacking one thing, lost many sales because the car failed to stand the test on the outside roads. This was a car that came out with an unusually small brake. Things like that do not go unobserved in this country of motor fans. It was the source of 75 per cent of his sales resistance.

Finally, the factory made a change and did a mighty good job of it. It was an advertisable feature that meant something at a particular time, and without over-emphasizing it or unduly calling attention to it, it was nevertheless possible to use the point to good advantage. None of the factory copy helped in this respect.

Not so very long ago, factory advertising chiefs held a conference at which they accused the average automobile dealer, when given any leeway in an advertising campaign, of frittering away the fund on things such as lodge programs and carnival programs and similarly admittedly ineffective ways of spending advertising money.

However, as a counter to that, the dealer can point out such instances as the following: In one city civic clubs and women's organizations in the community said in no

THIS letter was written by a man who is thoroughly familiar with selling automobiles in a practical way. He is in a position to know what dealers throughout the West are thinking.

He objects strongly to the demand which many factories are making that the dealer use only such advertising copy as is prepared by the factory. He believes that such a demand is unfair to the dealer and ineffective in producing maximum sales.

Factory sales managers may not agree with all of the opinions expressed. AUTOMOTIVE INDUSTRIES will be glad to print any further views on this important question.

uncertain terms what they thought of signs placed along a certain park drive where a community owned the right of way, but where adjoining property could be purchased for signing purposes. The factory had at that time started an extensive advertising campaign along this highway. They were requested to discontinue it by the community, and the dealer transmitted the request to the factory, but the factory insisted that the very opinion of the objectors would make the campaign more exclusive, and therefore the sign should go up. Needless to say, this campaign has been productive of nothing but ill-will and a continuous source of annoyance to the dealer who has been placed in an apologetic position ever since.

Then there is the flood of printed sales helps which clutter up every salesroom; pertinent facts, good illustrations and diagrams that tell a story that is valuable. The intelligent salesman can make no end of use of this material, but only a dealer who has to shovel this stuff into the furnace every so often knows how much of this material serves no useful purpose.

The factory's viewpoint in some respects is probably built on the theory that advertising in any community should build up their name, the name of their product to the end that their position in any community may be continuous and secure. The dealer, on the other hand, points out that precedents and past experience have shown conclusively that the most important asset which a factory can have in any community is a solid dealer organization, and that without that the best name falls by the wayside. To that end, the Western signers of the new contracts are of the opinion that it is a mistake to take the policy of local advertising out of the hands of the dealer and distributor.

Steering System Faults Explained

Editor, AUTOMOTIVE INDUSTRIES:

* Your recent articles pertaining to the question of easy steering of automotive vehicles are exceptionally timely. We must necessarily admit, with regret, however, that the question of steering and the fundamental laws that govern it have suffered much with neglect the past six or eight years. Very little if any information has been given publicity that would help to overcome the many faults of hard steering and front wheel wobble.

In the many cases that I have observed, front wheel wobble was overcome only at the expense of a very noticeably shortened life of the steering gear and this without actually removing the cause. In these instances bearings, bushings, tie rod knuckle pins and drag link springs were tightened which overcame the evil but only for a short time until these parts worked loose again. During the time that they were tight these parts were subjected to very rapid wear and consequent shortened life.

It can safely be said, without any hopes of having to retract the statement, that very few, if any, passenger cars or motor trucks have their drag links located in the proper position, to facilitate easy handling. It has been almost universally accepted that the position of the drag link should be such that its center-line intersects the center of the front spring eye. I have found by experience that this rule is incorrect and quite often results in front wheel wobble, depending entirely, of course, upon the characteristics of the front spring design.

It can be said that the center line of the drag link should be tangent to a radius of from two to four inches above the front spring eye under full load conditions. The true radii can be determined only by calculation. This radius or center which indicates the intersection of the drag link

center line is also the true center about which the axle, in its shackled condition, tends to rotate. With the drag link located thus the steering gear is relieved of every possible shock that would otherwise be delivered to it because of the fore and aft motion of the axle resulting from the various positions of the spring due to the irregularities of the road.

To relieve the steering gear of shock by the correct alignment of all parts that connect with it, is to relieve all of these working parts of shock and consequently increase the life of the entire mechanism.

A good practical rule to follow concerning the castor of the front axle and one that invariably eliminates even the slightest tendency to "shimmy," is to make the castor angle identical with the wheel spindle angle. In other words if the angle of the spindle is $1\frac{3}{4}$ deg. from the horizontal then the castor angle should also be $1\frac{3}{4}$ deg. I have personally conducted tests in which we exaggerated the castor angle to as much as 10 deg. and found the effect of hard steering becomes exceptionally apparent beyond 5 deg., the effect, however, increasing as the tire size was increased. It was also found that at any angle greater than 4 deg. front wheel wobble became almost uncontrollable. At 10 deg. it was impossible to exceed a speed faster than a walk due to "shimmy" caused by the exaggerated castor angle.

A. W. WERNER,

Chief Engineer, Parker Motor Truck Co.

Electrical Unit Standardization

Editor, AUTOMOTIVE INDUSTRIES:

We are very much in sympathy with some kind of a standardization program covering electrical units, and believe that a combination of the schedules proposed by J. G. Vincent in the Sept. 28 issue, and the schedule proposed by L. B. Ehrlich would be well worth considering.

While it might appear to be somewhat detrimental to progress, to standardize on the number of teeth in the starting motor pinion, yet this is one of the most annoying features of starting motor equipment and one which an effort should be made to standardize, and we believe that, by using perhaps a couple more sizes of starting motors, instead of the five sizes proposed by Vincent, it would be possible to standardize on the number of pinion teeth for a given size of starting motor. Then, the difference in their other characteristics would surely be such as to put them in the proper classification.

With reference to generator standards, we believe a similar numbering system should be used, and a set or two or three sets of specifications for each number of generator should be arrived at, somewhat as indicated by Ehrlich. For instance, we might take a No. A S. A. E. standard generator and we would have, say, three different sets of specifications covering this sized generator. I would give each of these two or three, or even four sets of specifications, a separate number or letter. It should then be possible to order, say, a No. 2-A generator and know just what you were getting, or the standard number could be No. 21 or No. 22, the first digit being for the No. 2 S. A. E. standard, the second for the particular specification required.

We firmly believe that the main mechanical and mounting dimensions should all be standardized for a given number of generator and starting motor and, further, that the characteristics of each generator in a given number should be standardized even though this might require two or three different sets of specifications. This, particularly, for generators. WALTER M. PETTY,

Service Motor Truck Co.

Problem of Production Becoming One of Management

Competitive advantage from operating equipment or methods tends to diminish. Further increase in output and decrease in costs will result from better leadership. Big questions all ones of human understanding, capacity and inspiration in management.

By Harry Tipper

THE problem of production is becoming more and more a problem of management. Advantages in machinery and processes are difficult to secure and still more difficult to maintain in the face of the widespread standardization and the competitive necessities.

Writing in 1900, Hobson, the economist, noted the tendency for all mechanical equipment, systems and methods of operation to become equally the property of all competitors within the field. As he noted, the ease of communication, the general advance in scientific knowledge, the necessity of the seller to reach the whole possible market, tended to reduce the opportunity for competitive advantage because of operating equipment or method.

Great variations still obtain in the matter of production costs. The advantages in this respect are not to be found exclusively in the largest establishments. In fact, many cases have developed when the largest companies have been placed at a disadvantage in competition with smaller concerns in the same line of endeavor.

Buying advantage, volume of production, and extent of distribution, are not in themselves sufficient to give a preferential position to any concern in the marketing of commodities. There are phases of the matter which account more largely for the variation in production costs in the same field with similar manufacturing requirements. These phases classify themselves as

- (a) Reduction of avoidable wastes.
- (b) Increase in production rate and reduction of labor cost and turnover.
- (c) The accuracy of the judgment in estimating the future conditions in buying and selling.

These are problems of management and relate directly to the understanding of those responsible for the factory

operations. They belong to the human side of industrial affairs more largely than the mechanical or systematic. The history of industry shows that wastes are reduced bit by bit. They are affected by the intelligent consideration of the man who is close to the operations. They are almost insignificant in the individual effect, but they assume large proportions as these small advances continue.

In one plant in the automotive field, a large cut in the operations was secured by the ability of the various supervisors to make a small cut in one or more of the items under their care.

Gas consumption for melting the cyanide had been reduced about 60 per cent by more careful insulation and better alloy in the pots. Tool consumption had been more accurately determined and savings effected by a more detailed and careful study of the actual service of a given tool.

All through the plant the same story obtained. To secure such results a number of supervisors had to work enthusiastically and intelligently with matters which were routine. It is a difficult matter to retain alert curiosity about familiar routine, to question the advisability of each piece of

work and each method. It is still more difficult to study out these small improvements in the face of the operating necessities always facing the supervisor. The work must be gotten out. Everything has a tendency to give way before this pressure for operation. To keep the minds of the supervisors active and alert, for those small improvements, which constitute the substantial progress in waste reduction, is a job of human understanding in management demanded of the real leader. This job argues the capacity to inspire, to instil confidence and to encourage by example and precept all through the establishment.

The increase in production rate is again a matter for management in human affairs. There is a tendency in all

WITH the ease of communication and increase in general scientific knowledge it is becoming increasingly difficult to obtain and maintain industrial supremacy through equipment and methods.

* * *

Harry Tipper points out that the reduction of waste, increase in production rate and reduction of labor costs and turnover and accuracy in forecasting buying and selling conditions are all problems of management.

* * *

He shows that good management requires getting the best from the individual through an understanding of human affairs and that supervisors of manufacturing labor should have a freer hand to bring about improvements in relationship which their close contact permits.

men to slack off to a minimum pace that which has become routine. Most men are interested in earnings only as a matter of necessity or the special urge of an unusual requirement. Many men are content to make a fair sum of money, although all men will take advantage of scarcity of labor to get more pay for the same work, and most men will strike for greater privileges; pay alone will not increase the production pace on the average. It takes a lot of careful study to work out a wage system and time study arrangements which will appear fair and reasonable. It requires intelligence in management of an unusual kind to keep men contented, working harder than the average of their occupation and staying with the same concern.

THE important part of the matter is its practicability.

It is evident that such items as a large production per man and a smaller labor turnover are possible from the fact that factories in a number of cities have done just this. In fact, there is no phase of management which shows a greater variation than the position of production costs from the standpoint of direct labor. Side by side in the same town factories employing the same kind of skilled help vary as much as 40 per cent in the effective costs. In all the metal trades industries there are factories showing smaller turnover, no strikes and few general disputes. These are practical effects secured from men of capacity, but not men of genius. For some reason, the men in these shops who are charged with the responsibility of management have had a free hand in governing the conditions.

I am firmly convinced, from much conversation with factory men, that there are many men in the supervision of manufacturing labor who could and would better the conditions in this respect if the general executives or directors would give them a reasonably free hand. Most of the more alert men in responsible charge are interested in the progress made in other shops. Many of them have studied the methods and results. Many of them have a good deal of understanding about the way to handle human beings, but not many of them have any power to change working conditions, labor rates or other general labor factors without the approval of other men further away from the subject and less capable of judging the wisdom of the action.

Decrease in production costs and reduction of labor turnover are matters of human relations, and belong to the realm of management. Little can be done with equipment and system; what is done must be done through understanding and judgment.

The circle of industry has materially enlarged even since the war. The automotive industry is more intimately affected by other conditions on the outside. Consequently the operations are more and more concerned with the efficiency of judgment displayed by the management in the speculative decision on the buying market for materials and the selling market for product.

HERE there is a great deal to be learned. Few manufacturers but misjudged the recent depression. Many misjudged the recovery. More are still misjudging the market conditions for automobiles, parts and accessories, so that all their other calculations are set by the ears on account of that error.

We have not had much practice in this speculative judgment on markets because it has not been necessary to consider the matter seriously until lately; consequently, we are not intelligent in estimating the outside conditions which affect these calculations.

Economic curves can help much. Charts of production and distribution are of value. But the position of the individual concern in this respect is not intimately re-

lated to these charts and curves, except as they are interpreted in the light of the individual history and the particular problem involved. This relation between the general economic circumstances and the particular factory is the speculative part of the problem of the buying and selling market. Experience is required in order to weigh outside circumstances, past records, present indications, and suggestions in the true light in connection with the responsibility of management. More and more the actions of business are concerned with the future, immediate and more distant. Every policy must be weighed for its future significance. Each new development must be considered in the same way. Plans must be determined to-day for operations affecting the market of next fall or five years from that time.

All these are speculative in the sense that they rest upon the interpretation of past events, and present conditions in their future suggestion. Each problem varies in this respect. Even when we knew that business would be poor in 1921 some factories went ahead with production at full pace. In a number of cases this was justified—in some it was not. What made the difference?

THE individual circumstances, finances, costs, sales work, trade reputation, operating ability, etc., all entered in. In some cases they were measured more correctly than in others.

The speculative judgment on the immediate future and more distant requirement of the buying and selling markets is a part of the job of management and one of the items demanded by the competitive conditions in a more efficient industrial establishment.

So the big problems are all problems of human understanding, capacity and inspiration in management rather than matters of systems and equipment.

Educating Independent Garage Men

THE independent garage is an important factor in the maintenance of the electrical equipment on the automobile. There are large numbers of owners who are not conveniently located with respect to authorized electric service stations. When these owners have electrical trouble, they naturally turn to the man that they regularly patronize for maintenance work.

The education of the independent garage man on the subject of maintenance of electrical equipment is consequently of major importance if owners are to get satisfaction from the electrical equipment on their cars. The garageman must know how to diagnose the trouble, how to fix it and where to get such replacement parts as are necessary. In an effort to supply the garageman with this sort of information, the Westinghouse Electric & Mfg. Co. has compiled the Westinghouse Automotive Electric Service Encyclopedia and Parts Data in two volumes.

Volume I deals first with electrical fundamentals and with the various units that go to make up the electrical equipment on the motor car. Following this, there is a section devoted to the internal wiring diagrams of various types of equipment. The next section gives the wiring diagrams for Westinghouse equipped cars. Another section tells how to locate trouble. The following section gives detailed instructions for the construction of test equipment, after which comes a section on test specifications. The last part of the book describes the Westinghouse equipment on various makes of cars more completely. This section is arranged alphabetically. Volume II gives the style number and price of every Westinghouse unit and each of its parts. It also tells how and where to order parts.

AUTOMOTIVE INDUSTRIES

THE AUTOMOBILE

Reg. U. S. Pat. Off.

PUBLISHED WEEKLY

Copyright 1922 by The Class Journal Co.

Vol. XLVII

Thursday, December 7, 1922

No. 23

THE CLASS JOURNAL COMPANY

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Owned by United Publishers Corporation, Address 239 West 39th St., New York; H. M. Swetland, President; Charles G. Phillips, Vice-President; A. C. Pearson, Treasurer; Fritz J. Frank, Secretary.

Entered as second-class matter Jan. 2, 1903, at the post-office at New York, New York, under the Act of March 3, 1879.

Member of Associated Business Papers, Inc.

Member of the Audit Bureau of Circulations.

Automotive Industries—The Automobile is a consolidation of The Automobile (monthly) and the Motor Review (weekly), May 1902, Dealer and Repairman (monthly), October, 1903, and the Automobile Magazine (monthly) July, 1907.

Watch Your Coal Bins

FORTUNATELY for the automotive industry the fuel problem was solved temporarily before it became so acute that operations were completely curtailed, but the strike lasted long enough to show what might have happened had it continued much longer. For one thing it meant a big increase in the coal bills.

One fact which should be kept constantly in mind by large consumers of fuel is that the agreement between the miners and operators was merely a temporary one and that it will expire April 1. Little progress has been made in arriving at an arrangement which will mean permanent peace in the coal fields.

When the strike began last year it was viewed with comparative indifference because there were large reserve stocks above ground. No such condition will prevail next spring and if there is another suspension

of operations it will become serious much more quickly.

Automotive manufacturers were fortunate last year because they had been given ample warning that a strike was impending and were able to accumulate reserves. The situation should be watched closely for the next few months to the end that the industry may be as happily situated if there is to be another walk-out.

Owners Dictate Future Design

EVERY car owner is a potential inventor. Despite the credit due to engineers for improving automotive vehicles, the 13,000,000 people in the world who drive cars and trucks are primarily responsible for improvements in design. The car user knows very definitely what doesn't please him in the operation of his vehicle. Regardless of engineering effort, he will always find "something to kick about." These "kicks" are the acorns from which the oaks of design improvement later grow.

Manufacturers who are to go forward most rapidly will begin to pay more attention to what the owner thinks about their product. They will devise methods of getting owner-reaction from every part of the country, and will definitely attempt to incorporate that reaction into future construction policies.

When an owner is displeased with something about a car he rarely knows the real reason for the trouble or the difficulties of remedying it. He simply knows that he is not satisfied. To explain to him the reasons for the trouble may convince him intellectually that he has all that can be expected, but it does not satisfy his desire for the something better that he wants.

Engineers may say that the popular desires are frequently visionary and unpractical. Frequently they are, so far as present practice is concerned. They deserve careful consideration, nevertheless, because current expert practice is always somewhat behind current needs and desires.

Don't Forget Your Foreign Trade

AMERICAN manufacturers cannot afford to let domestic prosperity obscure the enormous trade possibilities abroad. Although this business may not be thrown on our doorsteps it is vital to the continued prosperity of American business. Foreign outlets must be found for surplus American products if our mills are to be kept operating at capacity.

Now is the time to lay the foundation for an export trade which will keep the wolf from the door in periods of depression at home. Such a business cannot be retained permanently if foreign fields are forgotten as soon as domestic demand insures a market for all the goods which can be made.

Success in foreign trade demands patience, courage and foresight. It cannot be built up overnight as a stop gap to overcome the effects of depression at home.

Keeping everlastingly at it is the only way to get and retain sales in other lands.

Trade is beginning to revive in Great Britain and trade there always means foreign trade. Notwithstanding the collapse of currency in Germany that country has been able to build what are said to be the largest freight steamships ever constructed in Europe.

These are indications that our chief rivals in international trade are emerging from after the war chaos. They are preparing to go after foreign trade with the energy and patience for which they have been noted and if America is not to lose what it has gained it must keep constantly on the job.

Difficulties of Noise Measurement

ENERGY in all its different forms is undoubtedly capable of measurement, but in some forms such measurement seems to involve much more difficulty than in others. This applies particularly to sound or that form of sound with which we have most often to deal in mechanics—noise. There is obviously a good deal of similarity between noise and light in this respect, as both, if they emanated from point sources, should follow the same law as regards variation in their intensity with distance. This "inverse squares" law is made use of in all measurements of luminous intensity. It could undoubtedly also be applied to the case of noise measurement if the noise emanated from a restricted area and if it were found possible to absorb sound by any walls as effectively as it is possible to absorb light radiation by a black surface.

A sound wave carries a certain amount of energy which can be made to deflect a lightly mounted vane upon which it strikes, and the resistance to the deflecting force on the vane may be taken as a measure of the intensity of the sound at that point. The difficulty here is that of the sound energy acting on the vane, generally only a small portion travels directly from the source to the vane, most of it reaching the vane by being reflected by the floors, walls and ceiling of the room in which the test is being made, as well as by other objects within the room, or if the test were made in the open, the sound would be reflected by the ground and by any nearby objects. It seems impractical to have both the source of noise and the indicator of sound energy mounted far away from any surfaces capable of acting as sound reflectors, but it is not impossible that a method may be discovered of so constructing or lining walls that they will absorb practically all of the sound energy that falls upon them. This is really the chief problem involved in the development of a method for measuring or comparing noises.

There are, however, also other difficulties connected with the problem. In comparing gear noises and other objectionable noises of machinery, what we desire to know is which is the most objectionable to the ear. It does not require much argument to make it plain that all sounds are not objectionable in direct

proportion to their wave energy, but that much depends upon the character of the sound. Of course, as long as we confine our measurements to any particular kind of noise, such as gear noise, this difficulty practically vanishes.

This problem of the measurement of noises has received a good deal of attention recently in connection with gear noises, but if it is solved effectively there will be many other uses for the method evolved. In automotive engineering we could use it to advantage also in determining engine noises, which might possibly be divided into valve noises, exhaust noises, etc.

Perhaps some day we will have a noise measuring technique as highly developed as photometric science is to-day. In this latter field we now have an instrument which when placed at any point of an artificially illuminated room will tell immediately the intensity of illumination at that point in foot candles. For the unit of sound energy the name caruso has been proposed; the unit, however, seems to still lack a precise definition, but that could probably be readily supplied if once an accurate method of comparison of sounds had been found.

Keep the Name of the Industry Clean

EVERY man connected with an automobile manufacturing plant affects future sales favorably or unfavorably by his personal conduct. Small deeds, relatively unimportant in themselves, are frequently responsible for strong and widespread criticism of the industry as a whole. The following letter, recently received by AUTOMOTIVE INDUSTRIES from a prominent industrial executive, illustrates this point admirably. The letter tells its own story and points its own moral:

"A friend of ours just came in from Philadelphia this morning on a train that was three hours late and he had to put up with a lot of drunken nonsense from representatives of your industry who were coming out here from Philadelphia to drive cars back.

"This man has been on a lot of trains out of Philadelphia and New York in the last year or so and says it's been his misfortune many, many times to hit trains with these gangs that were being brought out to drive cars home. I am just wondering if that is a good advertisement for the automobile industry.

"Granted, there are only a comparatively few of these men out of the hundred million people in this country. Nevertheless, it rather seems to me if I were on a train, saw a drunken gang like that and discovered what car they were going to drive back, that certainly would be the last car that I would want to use because there would be no telling what shape it would be in by the time it got to Philadelphia.

"In their liquid loquacity, this bunch admitted that a number of them were pinched the last time they came East driving through Beaver Falls. Driving away is a good proposition for a car if it is well handled, but I have seen some drive-aways that I wouldn't take as a gift."

November Output May Be 220,000

Year Moves Forward to 2,500,000 Mark

That Total Probable Despite Regular Inventory Taking at Holiday Season

NEW YORK, Dec. 4—With a total production of cars and trucks estimated at 220,000, November not only establishes a new record for that month but becomes the ninth consecutive month to pass the 200,000 mark. This figure was reached in the face of a short working month, inclusive of a holiday, which was the only factor keeping the total output from equaling that of October.

As it is, the high mark in the production history of the industry for a year's output has been passed by a substantial margin and the end of December will probably see the total production for the twelve months around 2,500,000. There will be some curtailment of operations this month due chiefly to the closing of many of the plants for the regular inventory taking. But even with this done the output will have to be only slightly in excess of 150,000 to bring the year's total to that figure.

Operations at High Level

Manufacturing is being maintained at a remarkably high level, despite the season of the year when there is a seasonal lull both at plants and in the sales field, and few producers are reporting any tapering off of schedules. They are being governed in their operations solely by the demand and as yet there is no wide evidence of a sales decline.

While closed cars continue foremost in the manufacturing programs, there is evidence of an expansion in open car production, which will grow steadily to meet the anticipated demand in the spring. Body plants are working full blast to catch up with back demands as well as to meet current demands. So great is the press for closed bodies that factories producing them will work at maximum capacity throughout the winter. Greater relief will come with the opening of additional plants after the first of the year.

Some improvement is noted in the transportation situation. Shipments are being received by Pacific Coast

Business in Brief

NEW YORK, Dec. 7—Industry is generally active. The jobbing trade has kept a good pace aided by holiday buying and retail trade has been stimulated by colder weather. Primary lines in general are quieter. Collections are slightly easier.

Complaint of car shortage continues to be widespread, although the situation appears to be somewhat improved. Supply of cars seems to be poorest in West Virginia and central Pennsylvania.

Car loadings for the week ending Nov. 18 exceeded those of the week of Nov. 11 by 15,185 cars. Coal was responsible for this upward turn. Total loadings aggregated 969,094 for the week.

Crops are moving to markets more freely. England is buying Manitoba wheat, and some 20,000,000 bushels may be expected to move eastward in the next two weeks. Winter wheat crop conditions have improved and a larger acreage has been planted than was at first expected.

Building has proceeded at a fast rate due to the open season. This has maintained activity in building materials. Delayed coal shipments have affected production of brick, cement and lime.

Steel prices have eased slightly. Railway material is taking large amounts of steel and cars continue to be ordered. Furnace coke is at the lowest point since the end of the strike.

Stocks recovered before the holidays after being depressed by bear raids. Bonds moved irregularly. Sterling reached 4.52¼ for demand. This is the highest point since July, 1919. Money rates continue steady. Bank clearings totaled \$5,499,985,000, a loss of 23.6 per cent from the previous week.

dealers with more regularity and added rail equipment is moving carloads that have been awaiting movement for some weeks. It is confidently believed that the worst of the difficulties in getting cars to dealers have passed and from now on there will be noticeable improvement. Driveaways are reported to be decreasing and

(Continued on page 1153)

Taking of Inventory Starts in Milwaukee

Some Plants in Districts Close Although Closed Car Shipments Continue

MILWAUKEE, Dec. 4—As might be expected, there has been a slowing up of automotive production schedules since the Thanksgiving Day recess, but this is far less in effect than it has been in any other year at this period. A good many shops closed down Wednesday night until Monday morning, over the holiday, inasmuch as need of parts by manufacturers is less urgent, and while delivery specifications are well sustained, considerable of the current output is going into stock for meeting shipping directions when these become more active after Jan. 1.

The let-down in passenger production in this district is not uniform, at least one factory still being virtually on a capacity basis while others are as a rule down partly or wholly and engaged in inventories. Shipments, however, are going forward every day, these embracing principally closed models, considerable of which are still on back order.

Dealers are taking a few open cars, not so much for stock as for display purposes and the endeavor to obviate a barren aspect of show windows and sales floors, and they are also taking all the closed types available, using the surplus over current sales for stock and display.

Parts Makers Work Steadily

Makers of engines, transmissions, frames and other units are working steadily, although their shipments temporarily are lower. These industries look for a satisfactory December, but no resumption of brisk activity until after the national shows and the resumption of factory production on quantity scale in preparation of spring deliveries to distributors and dealers.

It is significant that parts makers have encountered no such slump in orders as usually has been experienced in former years after Oct. 15 or Nov. 5. The present let-down has been gradual and began much later, while its extent is not severe.

Tractor and power farm operating equipment manufacturers look to see the big exposition of the industry at the Wisconsin implement association convention in Milwaukee this week develop considerable business and give them a basis upon which to determine production schedules for the coming three or four months.

December Opens with Big Programs

Curtailment Is Due with Holiday Season

Price Changes and New Models
Keep Business Continuing in
Good Volume

DETROIT, Dec. 1—Manufacturing in December will show a gradual decline owing to the lateness of the season and the holiday inventory period. While there is continued extensive buying of closed models, most of the open cars are going to dealers for stocking over the turn of the year. This is especially true in the middle priced field, there still being a large volume of purchasing of open models in the low-priced and better-priced lines. Price changes and new models in a number of lines have kept business coming through in greater volume than usual at this time of year.

Manufacturers generally are rushing through a large number of cars before winter weather complicates the railroad situation. Shipping during the early months of the year may be curtailed greatly because of the shortage of transportation facilities and it is desired to provide ample stocks against this. There is, however, much ready business and schedules are conservatively based.

Schedules of Companies

Ford sales during November will exceed 100,000, practically all of which are in the domestic field, and due largely to the recent price cut. Sales following the reduction have exceeded expectations and will necessitate the manufacture of 100,000 vehicles in December, despite inventory period. Closed car business is about 25 per cent of the total. Tractor manufacturing is approximating 200 daily.

Chevrolet is building 1200 cars daily and will increase this output during the month. Business is running strong on closed cars, and orders are several months ahead in practically every model. There is a large ready market for its open models, and the company is intensifying its sales efforts in all territories.

Companies manufacturing closed cars of the utility type report these behind orders in almost every instance. From ten to thirty days are required for deliveries. In this group are Dodge Brothers, Maxwell, Hupp, Dort and Studebaker. Schedules in these plants on all models show Dodge Brothers to be manufacturing about 500 daily; Maxwell, 200;

Dealer Should Be Given Greater Education on Part Plant Advertising Plays in His Selling Campaign

By W. K. Towers,

Advertising Manager of the Paige-Detroit Motor Car Co. and Jewett Motors

Detroit, Dec. 4.

INCREASED competition in the automobile business in 1923 means increased competition in advertising and it will be necessary to study mediums very carefully and devise new mediums. If this department is to be efficient in carrying out its part of the work of building sales more money will be spent in advertising than ever before. At this time, practically the entire available billboard space of the country is sold out for the year. Dealer co-operative work on advertising will probably reach a higher point in 1923 than it ever has done. In this latter field lies the most important work that the advertising department must undertake.

Dealers must be educated to the point where they can tie in their sales efforts with the advertising matter that is carried. Whether in national or local mediums having a dealer study the advertising matter and the persons to whose attention it is being brought means increased sales. Much advertising value is lost due to the failure of dealers to adopt the ideas carried out in the advertising.

Dealers should be educated to knowing that a sale is only part of a sequence of activities, the first of which is the national advertising. This is followed by the local advertising, then the personal letter or pamphlet in the mail and then the call of the salesman. Unless this follow-up campaign is adhered to faithfully, the advertising has not been successful. With dealers convinced of the efficacy of this chain of action, much improvement will be found in business.

Some sort of united action should be taken by the industry to formulate policies in relation to dealer co-operation on advertising. We are still in the formative stage and should be careful in the precedents we set. Dealers may become so accustomed to policies now in effect that it will be difficult to change them later. Should there be no definite ground on which to work we will be faced with the question of following suit each time a company alters its policy.

Factory help to dealers on used car advertising cannot go beyond the institutional stage of building up dealer reputation by helping to place the dealer as a reliable merchant. We build reputations which reacts favorably to ourselves in the sale of new cars. It cannot be expected that one factory will help to advertise another because its dealer has used cars of the other make to dispose of.

Poster advertising has been found effective and the industry should not participate in any movement to destroy this for purely esthetic motives. As long as others continue to use this form of advertising the industry should also share it to the full. Highway signs which are dangerous to travel should be removed but others than these should not be disturbed unless there is general demand for their discontinuance.

Hupp, 100; Dort, 100, and Studebaker, 400, in all plants.

Buick is continuing its heavy production. Schedules in all plants, including Canada, approximate 600 daily, a large part of which is in its touring sedans. Hudson and Essex are building about 250 daily, with its coach models leading in popularity. Closed car Hudson and Essex business is now close to 60 per cent.

Better priced lines are running close to capacity. Cadillac with new low prices in effect is building about 100 daily. Packard is increasing its production in December to 2250 a month, a 25 per cent increase over its earlier year schedules. Lincoln production at the rate

(Continued on page 1152)

Willys Claims Agreement to Be Heard December 11

TOLEDO, Dec. 3—Date for the hearing on an agreement concerning disputed claims between the Willys-Overland Co. and the Willys Corp. has been set for Dec. 11 in the local Federal court.

Curtis T. Johnson, special master, has heard a number of the special and smaller claims not included in the mutual agreement reached some months ago. In the general agreement, claims of the Willys-Overland Co. against the Willys Corp. were limited to \$167,797 and those of the Willys Corp. against the Willys-Overland Co. to \$189,554. Neither of these amounts will now be pressed.

Goodyear Abrogates Kennedy Agreement

New Contract Entered Into Which Eliminates Bonus Provision Contained in Old

AKRON, Dec. 4—The contract between the Goodyear Tire & Rubber Co. of Akron and Leonard Kennedy & Co. of New York which provided for the payment by Goodyear of \$250,000 a year plus five per cent of Goodyear profits between \$10,000,000 and \$20,000,000 annually for management of the Goodyear company, and which was made the basis of the suits filed in the Akron courts Aug. 8 by Mrs. Laura L. T. Weiss of Cleveland attacking the legality of the entire \$85,000,000 refinancing and reorganization program of Goodyear was completely abrogated and discarded on Nov. 24 by Goodyear directors at a meeting held in New York, it has just become known here.

\$250,000 Provision Retained

The abrogation of the contract entered into under date of May 1, 1921, by Goodyear—the date when the company's reorganization program was consummated, was followed by the writing and entering into by the Goodyear directorate of a new contract with Leonard Kennedy & Co. which still provides for the payment of \$250,000 a year, but which eliminates the provision calling for payment each year of a five per cent bonus.

In view of the fact that the contract formed the basis for Mrs. Weiss's four actions as a Goodyear stockholder, the action of Goodyear directors in abrogating the contract and entering into a new agreement, is considered significant from the viewpoint of old common and preferred stockholders of the Goodyear company.

Francis Seiberling and Russell Robinson of Akron, two members of the Goodyear directorate board who have filed answers in which they join with Mrs. Weiss in her allegations as to the believed illegality of the Kennedy contract, were not present at the meeting of directors when the contract was discarded. Both were unable to attend due to personal business.

Action Disclosed in Court

The action was not publicly revealed until the motion filed by the Kennedy company, seeking to have service of summons upon it in the Weiss suits quashed came up for hearing before Common Pleas Judge W. J. Ahern of Akron. Attorneys for Mrs. Weiss then asked that the hearing be postponed until they could secure a copy of the new contract.

E. G. Wilmer, president of Goodyear under the refinancing program, declined to commit himself as to the Goodyear directorate action, but did not deny that such action had been taken. Goodyear directors who were not at the meeting

MAKERS INQUIRING OF STEEL FOR 1923

PITTSBURGH, Dec. 4—Officials of steel plants here are expecting that activity in the automobile plants will provide them with sufficient orders to round out their first quarter's production next year, so that it will prove equal to their fall business.

With this in view, there is not expected to be any change by the big steel producing plants in the price of automobile sheets for the first quarter and the ruling rate of 5 cents is likely to prevail.

The contemplated expansion in the spring building program of the automobile industry is one of the few optimistic factors in the business life of the steel industry. Comparatively few of the big automobile plants have as yet placed their orders for sheets and bars, but many inquiries have been made and commitments are expected to be made in a short time.

Nov. 24, however, have confirmed the negotiation of the new contract.

Motions seeking to quash service of summons on Owen Young of the General Electric Co. of New York and Clarence Dillon of Dillon, Reade & Co., two of the three trustees of the 10,000 shares of management stock issued under the refinancing program, have been argued before Judge Ahern, who has allowed two weeks for the filing of briefs.

Dillon, Young and John Sherwin of the Union Trust Co. of Cleveland are named defendants in one of the four Weiss actions. In this case Mrs. Weiss claims illegal issuance of the 10,000 shares of management stock to the three, and also charges dissipation of Goodyear assets through payment to each of them of \$10,000 a year as salary, in addition to provision of a \$10,000 traveling fund, available for all. She also claims this management stock as a voting power under the refinancing program which virtually controls the Goodyear company to the exclusion of the voting power of stockholders.

Dillon and Young seek to have the service of summons quashed on the ground that they are residents of New York and are outside the jurisdiction of the Akron court. Sherwin has accepted service of summons in the case and has filed his answer, entering a general denial to the allegations of Mrs. Weiss's petition.

FORD TO MOVE GLASS PLANT

DETROIT, Dec. 4—The glass manufacturing plant of the Ford Motor Co. will be located at River Rouge. The present plant at Highland Park, where experiments with glass production were made, will be abandoned when operations at the Rouge begin.

Hoover Bumper Claim Sustained by Court

Accounting of Profits from Lyon's Sales Ordered Made to American Chain Co.

SAN FRANCISCO, Dec. 4—By a decision of Judge H. M. Wright of Los Angeles, Special Master in Chancery, the American Chain Co. wins its suit against the Chester N. Weaver Co. of San Francisco, involving the validity and priority of the Hoover spring bumper as against that of the Lyon bumper, which is declared an infringement on the Hoover patent. An accounting of profits accruing from the sale of Lyon bumpers from 1916 to 1922 is ordered.

The suit was brought by the American Chain Co. in the southern division of the United States district court for the northern district of California, Judge Van Fleet presiding, and the finding of the Master in Chancery is subject to review and revision by the court. Both sides to the suit, however, agreed to abide by the decision of Judge Wright, and there is little probability that the court will interfere.

Manufacturer Not in Suit

The Lyon bumper is manufactured by the Metal Stamping Co. of Long Island City, and an attempt was made to include this firm in the defendants along with the Weaver company, which is western distributor for the Lyon bumper, but this inclusion was not allowed owing to a technicality in the filing of the amended suit by the attorneys for the plaintiff, the American Chain Co. It is generally understood here, however, that the Metal Stamping Co. will be made defendant in another suit.

It was shown during the 14 days' hearing of the suit that more than half a million Lyon bumpers have been distributed, and an accounting of the profit on these to the American Chain Co., to which Thomas A. Hoover of Fresno, Cal., assigned his patent, has been ordered. The Weaver company, in its defense, attacked the Hoover patent on the ground of want of invention novelty, lack of utility and priority of the Lyon invention as well as prior publication.

Question of Priority Important

The Special Master in Chancery considers the question of priority as the one of greatest importance and, after disposing of negatives of the other claims of the defense, declares other alleged prior inventions, such as those patented by Muir, Harroun, Welton, Newcomb and Harris, to have been of the rigid bar type, whereas the Hoover bumper is of the spring bar type. Concerning the claims of Lyon to priority of invention, the master's report says:

I accordingly find that the Hoover letters patent are valid. It is not necessary to say whether the Hoover invention is of a pioneer
(Continued on page 1155)

Reo's Report Shows \$3,140,529 Profits

Assets Increased and Liabilities
Decreased During Year End-
ing August 31

LANSING, MICH., Dec. 5—Total assets of the Reo Motor Car Co. are \$16,238,864, and current liabilities, \$2,783,025, according to the financial statement as of Aug. 31. The assets have grown \$4,000,000 over 1921 and liabilities have decreased. Net profits for the fiscal year were \$3,140,529. President R. E. Olds said.

In his statement to stockholders, Olds said:

Amounts due the company on notes and open accounts show a substantial reduction over the previous year. This is gratifying in view of our increasing volume of business and tends to show the gradual recovery which is taking place in the business world.

Inventories of raw materials and finished products at the plant and in stock at branches are priced on a conservative basis. These show a slight increase over the last annual report. Extensions to buildings and plant equipment have been made as required without the issue of bonds or preferred stock.

New types of open and closed cars have been added and these have had an unprecedented reception which argues well for the future plans of the company. The Reo selling organization is continuously increasing its list of distributors and dealers and expanding its territorial lines. In entering upon our nineteenth year there is every indication of a successful and increased business.

Current Assets and Liabilities

The current assets of the company show \$5,886,880 cash, bills receivable, \$2,335,560, and inventories of \$7,174,603 as principal items. In the current liabilities, the principal items are accounts payable of \$1,734,708, and reserve for taxes of \$915,590. During the year in addition to cash dividends, \$6,937,250 was transferred from surplus account to permanent investment in the form of a 100 per cent stock dividend. The present surplus is \$5,719,913 as compared to \$9,785,666 last year. The present book value of the common stock is \$14.12.

In connection with the annual report it is noted that the directorate of Reo, comprised exclusively of its officers, has not changed in its 18 years of organization. These are R. E. Olds, president; R. H. Scott, vice-president and general manager; H. T. Thomas, vice-president and chief engineer; D. E. Bates, secretary and treasurer; R. C. Rueschaw, sales manager; George E. Smith, purchasing manager, and Harry C. Teel, factory superintendent.

ADDITIONS TO DANIELS BOARD

NEW YORK, Dec. 4—E. Roland Harri-man, Henry Coleman Drayton and F. Frazier Jelke of Jelke, Hood & Co., and Philip Kip Rhinelander of the banking

firm of Gillespie, Meeds & Co., have been added to the board of directors of the Daniels Motor Co., whose plant is located at Reading, Pa.

The four new board members are reported to have acquired a substantial stock interest in the company, and it is expected that the infusion of new blood will be followed by important industrial expansions. The company now is building its own engines at the Reading plant.

Berkshire Magneto Sold to J. & B. of Pittsfield

PITTSFIELD, MASS., Dec. 4—The J. & B. Co. has purchased the Berkshire Magneto Co. and is forming the Berkshire Products Corp., which will produce on a larger scale the principal products identified with the two companies. The change will be effective Dec. 15. The Berkshire Magneto plant is to be closed and the equipment moved to the J. & B. plant. It is understood that the ignition coils and timers for cars, trucks and tractors, leading J. & B. lines, and magnetos and windshield wipers, leaders for the Berkshire Magneto, will continue to be manufactured extensively, together with other apparatus of an automotive nature.

By the merger, Frederick G. Crane and his son, Frederick G. Crane, Jr., who have been the principal owners of the Berkshire Magneto, acquire a substantial interest in the consolidated property, whose capitalization is to be increased. Edward T. Shaw of the Berkshire Magneto will be retained as research engineer.

The officers will be: President, treasurer and general manager, George H. Southard; vice-president and director of sales, Harrie R. Williams; secretary and assistant general manager, Raymond D. Tufts; directors, Clement F. Coogan, Kelton B. Miller, David J. Gimlich, Frederick G. Crane, Jr., Harrie R. Williams, Raymond D. Tufts, George H. Southard, Jr., and Walter C. Kellogg. The merger reunites two concerns that sprang from the old Pittsfield Spark Coil Co.

DUPLEX MAY INCREASE BOARD

DETROIT, Dec. 5—Stockholders of the Duplex Truck Co. will vote at the annual meeting, Dec. 12 on a proposal to enlarge the board of directors and also to increase the capitalization from 100,000 to 125,000 shares with a par value of \$10 if the changes are agreed to. The company intimates that it will extend its sales and manufacturing fields and that changes in managements will be made.

RUSSIA REVOKES LICENSES

WASHINGTON, Dec. 4—According to advices received by the Automotive Division to the Department of Commerce, the Russian Soviet Government has revoked the licenses to import motor vehicles and has requested a large American manufacturer to supply passenger cars direct to the government at wholesale prices.

Paige Plans 65,000 Production in 1923

Of This Output, 50,000 Will Be
Jewetts—Closed Cars Will
Reach 40 Per Cent

DETROIT, Dec. 4—Paige-Detroit Motor Car Co. and Jewett Motors has scheduled 50,000 Jewetts and 15,000 Paiges as its production in 1923, about 40 per cent of which are expected to be closed cars. This new total will be about 100 per cent greater than 1922 production.

Production this year, the company declares, will double the best previous year the company has had.

To provide for increased manufacturing, the company has taken over the former plant of the Hinkley Motor Co. and will devote it exclusively to Paige assembly. Formerly both Paige and Jewett models were assembled in plant No. 1. This building in the future will be devoted exclusively to Jewett. Under the new plan, the company will specialize two entirely separate groups of employees on the two models.

With the addition of the Hinkley Building, the company will have seven plants in the southern section of Detroit. The two main plants, in addition to those above, are for the manufacture of Jewett engines and include the painting and trim buildings.

Company Making Ranger Placed in Receivership

HOUSTON, TEX., Dec. 4—A voluntary receivership petition filed in the State District Court has resulted in the naming of Ed F. Dupree as receiver for the Southern Motors Manufacturing Association, Limited, maker of Ranger cars, trucks and tractors under a bond of \$50,000.

Jacques E. Blevins, president of the company, asserts that the assets are approximately \$2,000,000 and that the liabilities will not exceed \$345,000.

Following the receivership, two local stockholders filed a petition of intervention, alleging mismanagement and asking for a court investigation. The court cited the president and officers to appear Dec. 6 to show what property had been sold, what amounts have been paid to the trustees during the past two years and what dealings the company had with the Union National Trust Co. and the Jacques E. Blevins Co., which are understood to have been connected with the financing of the automobile company.

The Southern Motors Manufacturing Association, Limited, was organized as a joint stock association Oct. 1, 1918, to build a plant and manufacture Ranger cars, trucks and tractors. The capital stock was placed at \$10,000,000, and it is understood that nearly half of this is outstanding. Most of the stockholders are residents of Texas.

Shipments Overseas Gained in October

Government Notes Increase in Ex- ports of Automobiles Priced Over \$800

WASHINGTON, Dec. 2—Considerably increased shipments of passenger cars to the overseas markets were recorded during October, as compared to the previous month. The monthly compilation of automotive exports, announced to-day by the Automotive Division of the Bureau of Foreign and Domestic Commerce, gives 6446 as the number of cars sent abroad in October, the similar shipments in the previous month having been 5862.

This increase was entirely in the two higher classifications, those with a value of from \$800 to \$2,000 showing a total approximately 33 per cent larger in October and the higher priced group, having a value in excess of \$2,000 having increased from 153 in September to 185 in the latter month. The shipments of lower priced cars, having a value of under \$800, were practically unchanged in number for the two months, although the value in October was slightly higher.

Truck Exports Declined

Truck shipments underwent a marked decline, totaling 791 in October as compared with 1295 in September. The shipments of parts, except engines and tires, were practically the same in each month, the October value being \$3,166,408.

In the three categories of trucks, the decrease in October fell particularly among those rated as 1-ton or under, but those rating up to 2½-ton also were somewhat lower. Of importance, however, was the increased exportation of the larger sizes rating above 2½-ton. The October shipments of 66 compared with 36 during September.

The export totals announced by the automotive divisions, pertaining only to the United States, are given in detail in the adjoining table and show that during the ten months ending with October the exports of passenger cars were 54,774, having a value of \$42,125,847. Truck shipments for the ten months are given as 8871, valued at \$6,803,655, and parts at \$31,576,680.

Canadian Figures

WASHINGTON, Dec. 4—The foreign shipments of passenger cars from Canada reached the highest mark of the year during October, according to an announcement to-day by the Bureau of Foreign and Domestic Commerce. The October export trade of the Canadian factories consisted of 3667 passenger cars, valued at \$2,365,409; 251 motor trucks, valued at \$107,524 and parts to the total of \$288,427. The September shipments from Canada consisted of 2943 passenger cars and 274 motor trucks. The principal Canadian markets consisted of Australia, the United Kingdom, New

Table That Shows Shipments of Products of the Automotive Industry from the United States in October, 1922, and the Totals for the Nine Previous Months

	Month of October 1921		1922		Nine Months Ending 1921		October 1922	
	No.	Value	No.	Value	No.	Value	No.	Value
Automobiles, including chassis	2,924	\$2,707,737	7,253	\$5,905,409	32,769	\$37,800,972	63,854	\$49,234,967
Electric trucks and passenger cars	.....	.....	16	21,742	.....	.....	209	305,465
Motor trucks and buses, except electric	595	755,096	.....	.....	6,540	9,469,719	.....	.....
Up to 1 ton	.....	.....	537	257,809	.....	.....	6,212	2,526,937
Over 1 and up to 2½ ton	.....	.....	188	265,352	.....	.....	2,046	2,561,769
Over 2½ ton	.....	.....	66	266,794	.....	.....	613	1,714,949
Total motor trucks and buses, except electric	595	755,096	791	789,955	6,540	9,469,719	8,871	6,803,655
PASSENGER CARS								
Passenger cars, except electric	2,329	1,952,641	.....	.....	26,229	28,331,253	.....	.....
Value up to \$800	.....	.....	3,853	2,005,124	.....	.....	34,839	16,951,862
Value over \$800 and up to \$2,000	.....	.....	2,408	2,587,081	.....	.....	18,226	20,112,829
Value over \$2,000	.....	.....	185	501,507	.....	.....	1,709	5,061,156
Total passenger cars, except electric	2,329	1,952,641	6,446	5,095,712	26,229	28,331,253	54,774	42,125,847
PARTS, ETC.								
Parts, except engines and tires	.....	2,702,002	*12,609,734	3,166,408	.....	33,824,455	*132,104,818	31,576,680
Station and warehouse motor trucks	8	9,680	5	5,822	307	239,065	128	131,947
Trailers	.....	.....	57	21,229	.....	.....	443	185,742
Airplanes and seaplanes	1	8,000	4	98,000	44	279,940	36	156,130
Parts of airplanes, except engines and tires	.....	4,421	*275,199	185,205	.....	136,955	*468,215	261,271
BICYCLES, ETC.								
Bicycles and Tricycles	.....	36,352	1,866	11,867	.....	1,383,586	9,094	108,330
Motorcycles	443	115,271	1,295	295,333	9,640	3,126,342	13,099	3,364,113
PARTS, EXCEPT TIRES								
Gas engines	37	10,090	332	58,249	935	278,447	4,003	575,934
Traction engines (steam) except agricultural	3	8,279	2	2,152	70	113,837	30	58,228
Aircraft engines	.....	.....	.....	.....	.....	.....	101	63,619
Complete tractors, except agricultural	39	74,298	4	12,350	5,174	5,708,363	41	116,205
Other internal combustion engines	217	16,544	728	81,939	6,917	1,434,666	4,143	651,414

*Pounds.

Zealand, South Africa, India and Argentina.

Packard's Dealer Force Increased 220 Per Cent

DETROIT, Dec. 4—Packard Motor Car Co. has increased its dealer organization 220 per cent in the United States and Canada during the year, giving the company representation in practically every important city. There also has been an increase of 48 per cent in distributors. Part of the increase, it is declared, is due to the discontinuance of branches by the company and some distributors.

As a result of the reorganization, R. E. Chamberlain, general sales manager, said a number of major changes in distributorships have been made where it was deemed that adequate facilities were not offered. Such changes were made in Buffalo, Pittsburgh, Washington, Baltimore, Toledo and Omaha.

Closer Contact Probable With Mechanical Schools

DETROIT, Dec. 4—As a result of the educational conference at the Hotel Tuller, the Federal Board of Vocational Education will undertake to establish a contact between those interested in automobile mechanical education and the automotive industry. The objective of this contact is to learn from the industry what it wants and expects from the automobile mechanical schools.

The conference was called by the Federal Board during the Regional Conference in Vocational Education and one session was set apart for the discussion of automotive educational problems. Seventy educators and representatives of the industry registered and practically all of them spoke during the day. Frank Cushman of Washington, Chief of the Industrial Education Service, presided and directed the discussion.

Most Mexican Sales Made on Cash Basis

Failure of Lacaud Bank, However, Has Not Destroyed Faith in Market

MEXICO CITY, MEXICO, Nov. 15 (by mail)—The failure of the Lacaud Bank (Banque Francaise du Mexique) and other financial institutions has affected practically every line of industry, including many automotive dealers whose business was financed by Lacaud and who, also, held their deposits. The result is a general feeling of unrest, but the consensus of opinion seems to be that this climax will have the effect of stabilizing activity and placing the automotive industry on a sounder basis from the general credit and financial standpoint.

Affected Some Companies

Some firms have lost considerable in cash and others have lost their chief stay in the matter of financing time payments. There has been no general rule here by which dealers have been governed in the extension of credit, and terms, apart from Ford sales, have ranged from three to ten months' and a year's credit, with an initial payment of from 20 to 50 per cent of the value of the car, the banks passing on the customer's credit and discounting the paper.

Several of the more important dealer organizations, however, have their own sources of financing. Two companies in particular which represent two of the best known lines of cars have their own finance organizations, and there is another which has back of it a silent partner who handles the financial paper on his own responsibility. Others have financing arrangements apart from the banks or such satisfactory relations with foreign financial institutions that they will be able probably to continue to extend some credit.

The result of the Lacaud failure has been an immediate tightening up of credit, and most sales are now being made on a cash basis. This probably will continue until conditions become easier.

New Buildings Going Up

This, however, does not mean that confidence in the market is lost. The Compania Automotriz Mexicana, which this year is doing a business of probably \$1,200,000 gold, is even now constructing a huge new building further up the Paseo de la Reforma which will be used for the display of second hand cars and as a garage and service station. The Capital Motors Co., the Studebaker agent, is also about to build and will have 900 square meters of floor space for use as a used car showroom. The Moon agents also are about to build new premises on Reforma.

Hence, it would appear that the mar-

COUZENS APPOINTED TO SENATE VACANCY

DETROIT, Dec. 6—The naming of Mayor James Couzens as United States Senator from Michigan to succeed Truman H. Newberry, resigned, places in the Senate one of the foremost automobile men of the country.

Couzens became identified with Henry Ford in the early days of the Ford Motor Co. and served as Ford's chief executive for many years. His original investment in the company brought him about \$29,000,000 when he sold out.

Since leaving Ford and his election as Mayor of Detroit, Couzens has devoted practically all his time to municipal affairs. He has been active in the advancement of the principle of municipal ownership of public utilities, the street car lines having recently been taken over by the city under his direction. By agreement Couzens will continue to direct the affairs of the street car company.

ket is not depressed, although there is no doubt but that this crisis will affect sales in the immediate future and make collections more difficult. On the other hand, it will have the further effect of bringing the industry to less liberal terms of credit.

The used car problem is causing some concern, and there is some agitation among certain dealers to endeavor to standardize used car prices. This probably will not work out, and the safest plan seems to be that of taking in old cars on a consignment basis, crediting the new car buyer with whatever sale price is arranged. Two of the larger companies at least are opening special showrooms for used cars, the handling of which then will be a separate and distinct part of the business.

Little Motor Kar Opens Plant After Shut-Down

DALLAS, TEXAS, Dec. 5—The Little Motor Kar Co., Ltd., has resumed operations after being out of production for more than a year. Work is being carried on under the direction of a board of trustees for the stockholders, with C. H. Holtmann as manager and chief engineer.

The company is now building road machinery, pumps, etc., and has turned out a light motor truck which has undergone severe tests. While the company will not produce automobiles for the present, it is understood, it likely will turn its attention in that direction.

SEARS TIRE EQUIPMENT SOLD

DAVENPORT, IOWA, Dec. 4—James A. Kerrigan and Leon A. Hass, trustees for the Sears Tire Equipment Co., bought in the entire property at sheriff's sale for \$32,168.

Irvine May Address Export Heads Jan. 8

Official Expected Back from Orient in Time for An- nual Meeting

NEW YORK, Dec. 5—The annual export managers meeting of the National Automobile Chamber of Commerce will be held here on Jan. 8 during the automobile show. This date, announced today by George F. Bauer, secretary of the foreign trade committee of the Chamber, was decided on at a recent meeting of the committee held in Detroit.

One of the topics of the program will be an address by William I. Irvine, who it is expected will have returned to the United States by that time, after a lengthy trip through the Orient as special commissioner of the Automotive Division of the Bureau of Foreign and Domestic Commerce.

Tariff to Be Discussed

Another discussion will center about ignition equipment for overseas vehicles. The distribution of gasoline and fuels in the foreign field will also be considered, and the chamber has requested that a representative of the Tariff Commission appear at the meeting to explain tariff policies.

Reports from several European countries indicate that readjustments of their automotive duties are being contemplated as a result of retaliatory features of the new American law, and the possibility of obtaining more equitable automotive tariffs throughout the world will be discussed at the export meeting.

Although the program is not complete, it probably will contain reports from several territories by recently returned travelers. Distribution abroad is another topic that has been suggested.

Speaking of the export situation, Bauer said:

A very evident feeling of betterment as to the export trade was apparent in the Detroit district. Larger sales next year are expected and some companies have been shipping in large volume. A number of higher executives of some of the producing companies have recently returned from trips abroad, mostly to Europe, and they have been keenly impressed with the possibilities for extending the foreign efforts of their companies. It is to be hoped that more executives will familiarize themselves with the foreign field, particularly in such sections as Latin-America and the East, which are large and growing sales fields.

Bauer Works on "Drawbacks"

Arrangements were also taken up at Detroit for obtaining refunds from the Government on aluminum imported from abroad under heavy duties, but exported again in finished articles. Bauer is co-operating with Government officials to arrive at a simple method of accounts for handling "drawbacks" of this character.

SOUTH OFFERING GOOD SALES FIELD

Bank Reports Show Improvement There

Resume of Conditions Indicates Best Opportunities from Automotive Viewpoint

BIRMINGHAM, Dec. 4—Conditions in many industries and many sections in the South show marked improvement since Oct. 15, as indicated by the increase in bank deposits; the greater movement and consumption of lumber, the activity in the manufacturing areas of Alabama and Tennessee and the improvement in the textile manufacturing industry.

On the other hand the coal mining industry during the same period has received a set-back, owing to the difficulty experienced by the mines in securing a sufficient number of cars to move their production, particularly since the order removing the "coal priority for cars."

Notable among the indications of improvement is the statement of the secretary of the State Banking Association of Arkansas that the banks of Little Rock now have on deposit more money than at any time during the history of banking in that city, the increased deposits from Oct. 13 to Nov. 13 being in the neighborhood of \$7,000,000. Another instance is found in the report of the condition of the Alabama State banks, which shows them as being in the best condition in the history of the State banking system.

Mississippi Bankers Meet

At a meeting of Group No. 1 of the Mississippi Bankers' Association held in Clarksdale, the feeling generally expressed was that Mississippi was well on its way out of the financial struggle brought on by the deflation and the resulting low price of cotton, together with the very short crop of last year. One of the leading banks of Tupelo showed a gain of \$1,000,000 in deposits in its last report. The president of this institution gave it as his opinion that the banks of that county alone (the largest city being Tupelo) had gained in the neighborhood of \$1,700,000.

This improvement in the financial condition of the South is echoed in the bank statements of practically every town in Alabama, Mississippi, Arkansas and in parts of Tennessee and Louisiana. The banks of Birmingham showed the largest clearings in the history of banking here during the month of October, being an increase of almost \$10,000,000 over the previous high record in September, 1922.

Birmingham, one of the largest lumber markets in the South, shows a condition from the point of view of the manufacturer, the wholesaler and the retailer that is unparalleled in the history of the trade in this section. The wholesalers report that in spite of the approaching winter and the car shortage November was a banner month. One of the most prominent of the wholesalers states: "I did the largest business this month that I have ever done. I did not make quite as much money, but my shipments exceeded anything on my records."

A prominent Birmingham manufacturer is sponsor for the statement that even in spite of the car shortage the actual shipments of lumber during the last two weeks of November were excellent for the season of the year, and added that the car situation had greatly improved and that the majority of the lumber shippers were now getting cars sufficient to take care of their needs. This is particularly true in the South, east of the Mississippi River; west of the river a great deal of trouble is still being experienced from the car shortage.

The iron and steel interests of the north Alabama area and the Chattanooga territory report an excellent business with orders that will take them through the balance of this year and well into 1923. A great many counties of the north Alabama area are producing good crops of cotton as the final figures are being tabulated. Notable among them is Madison County, in which Huntsville is located. The last figures on this county showing a production of approximately 25,000 bales, which at present

(Continued on page 1157)

Process Gear Authorizes Bond Issue of \$2,000,000

SYRACUSE, Dec. 6—With the issuance of \$2,000,000 in first mortgage serial gold bonds by the New Process Gear Co., Inc., of this city, announcement is made that the company's contracts assure a volume of business of between \$7,500,000 and \$10,000,000.

The bonds, maturing from one to ten years at the rate of \$200,000 a year, consist of a first mortgage on the land, buildings and equipment, and serve as a lien on the net earnings of the company. S. W. Straus & Co. of New York has underwritten the issue.

The property of the New Process Gear, which was recently purchased by Durant interests, embraces seven acres of land with buildings having a floor space of eight acres. The output provides for equipping 600,000 cars annually. Its net tangible assets amount to \$5,610,126, equal to \$2,805 for each \$1,000 of the new bond issue, with liabilities of \$124,493. The mortgage for the bonds has already been filed.

Far West May Levy 2 Cent Gasoline Tax

Eleven Governors Favor Uniformity in Taxation and Anti-Theft Laws

SAN FRANCISCO, Dec. 2—A tax of two cents per gallon will be placed on gasoline next year in 11 western States, if the governors of those States are able to press such a law through their respective State legislatures.

This agreement between the executives of California, Arizona, Nevada, Colorado, Idaho, Montana, New Mexico, Washington, Utah, Oregon and Wyoming was reached at a conference held in this city, attended by Governors Louis Hart of Washington, Emmet D. Boyle of Nevada and William D. Stephens of California, and the secretaries of the other eight governors; the executives themselves being in attendance at the Colorado River conference at Santa Fe, N. M., and unable to leave. Funds from this tax are to be applied to building and maintenance of roads.

Consider Uniform Theft Law

The governors and their representatives also decided to present to their respective legislatures, as soon as it could be drawn, a uniform law for the pursuit, arrest, identification and punishment of automobile thieves seeking to escape by fleeing from State to State, or driving stolen cars from State to State in an effort to sell them.

The gasoline tax law will be copied after the one now in force in Washington, Oregon and Arizona, but all the governors will co-operate on an anti-theft law under which pictures and identification tags of known automobile thieves and of suspects will be broadcasted to the police of all these States immediately on the theft of a car, with full information concerning the car, and, if possible, a photograph of it.

Under this head also comes a plan for a State automobile constabulary, mounted on motorcycles, for the patrol of the highways and the immediate pursuit of automobile thieves. Insofar as possible, State lines will be eliminated in the work of these mounted police by making them members of the force of each State in the agreement.

More equitable automotive taxation and uniform traffic rules for all the States also are to be considered by the legislatures of each of the 11 States at their coming sessions. The present plan is to have a later conference between members of the legislatures of these States to draft uniform laws and to arrive at an agreement on more equitable taxation.

Men of the Industry and What They Are Doing

Alvin Retires Because of Ill Health

Recommended by his physician to take a rest as a result of an automobile accident in which he nearly lost his life a short time ago, Forrest J. Alvin will retire on Jan. 1 as general manager of the United States Motor Truck Co., Cincinnati. After recuperating Alvin has no definite plans for the future.

Olds Adds to Engineer Staff

Robert White and N. M. Ogilvie have been added to the engineering staff at Olds Motor Works. White was formerly identified with the Cubitt Engineering Co., where he served as assembly manager, and with other British motor car manufacturers. Ogilvie was connected previously with Cadillac.

Paige Appoints James Levy

James Levy has been appointed body engineer of the Paige-Detroit Motor Car Co. and Jewett Motors. He was identified with the Liberty Motor Car Co. for six years and previously was connected with the Chalmers Motor Co.

Prof. F. A. Wirt Joins Case

Prof. F. A. Wirt, formerly professor of agricultural engineering, University of Arkansas, has joined the advertising department of the J. I. Case Threshing Machine Co. He will be engaged in sales promotion and advertising work.

Benjamin Drewes Resigns

Benjamin Drewes, superintendent of foundries of the Kissel Motor Car Co., has resigned to become assistant general foundry superintendent of the Fairbanks-Morse Manufacturing Co., Beloit, Wis., under R. J. Barr, in charge of the casting shops of this industry.

Martin Succeeds Anderson

William D. Martin has been appointed assistant general manager of the Kenosha, Wis., works of the American Brass Co. division of the Anaconda Copper Co., to fill the vacancy caused by the resignation of James R. Anderson. Martin was transferred from the Waterbury, Conn., works in 1909 to Kenosha as purchasing agent and more recently has had increased duties in the sales department.

Hugh Sharp Goes with Dealer

Hugh Sharp, for ten years associated with the Harley Davidson Motor Co., Milwaukee, with important duties in the promotion division of the sales department, is now associated with the Northwestern Motor Car Co., Milwaukee, Ford and Lincoln dealer.

H. M. Fletcher with Haynes

H. M. Fletcher of Detroit is the latest district traveling sales manager to

EUROPE IS CHANGING VIEW ON AUTOMOBILE

DETROIT, Dec. 5—Commenting on his recent trip abroad, Roy D. Chapin, president of the Hudson Motor Car Co., declares that he noticed that foreign governments, for the first time, are recognizing the automobile as a business transportation vehicle.

"Europe heretofore has regarded the automobile as a thing to hang taxes on," says Chapin. "Europe already has the roads, which in this country had to be built before the use of automobiles could expand, and just as soon as the foreign governments' taxing authorities treat the automobile as a business proposition, its use will increase rapidly in Europe."

be appointed by the Haynes Automobile Co. Fletcher has been assigned to Kentucky, Tennessee, Alabama, Mississippi, Louisiana and Arkansas. He has been district manager for Cadillac, King, Cole and Studebaker.

Government Interference, Theme at A. P. I. Meeting

ST. LOUIS, Dec. 6—At the opening session of the third annual meeting of the American Petroleum Industry, being held here, President Thomas A. O'Donnell, presiding, spoke chiefly against Government interference in business. He expects the overproduction of petroleum on the Pacific Coast to reach its peak soon and then to decline rapidly to normal.

A. C. Bedford of the Standard Oil Co. of New Jersey also emphasized the industry's aversion to other regulation in business except to uphold American rights abroad. He said that the petroleum industry has a ten to twelve billion investment primarily to supply the gasoline for the automotive industry. He predicted smaller profits in petroleum products in the future. Government interference with railways he said has resulted in shortage of transportation, but commerce has never halted through the failure of the petroleum industry to do its part.

Registration to-night numbered 600, with few automotive men in attendance.

TO DISSOLVE OHIO TRACTOR

COLUMBUS, Dec. 4—Stockholders of the Ohio Tractor Co., acting upon the recommendation of the board of directors, have voted to dissolve the corporation and liquidate its assets.

Foreign Field Good, Says Rickenbacker

Manufacturer Back Home Also Sees Wider Use Made of Four Wheel Brakes

NEW YORK, Dec. 4—Four-wheel brakes will be on most American cars within three years, predicts E. V. Rickenbacker, vice-president of the Rickenbacker Motor Co., after an extended European trip, which included both the French and English shows.

American traffic conditions, he contends, will force their adoption, and they will be just as essential as the self-starter. The need for acceleration in traffic and the control they give are the factors that will bring about their adoption, he thinks.

Regarding conditions as he found them, Rickenbacker says:

In both England and France I found the four-wheel brake coming into general use. Even cars as light as 1000 and 1200 pounds are using them. I should say that a majority of French makers have taken them up. And I believe that some of our own manufacturers are quietly investigating this European practice, for I heard of one big concern, whose representatives were abroad at the same time, buying three of the French four-wheel brake patents recently.

Tariff Discussed in France

France is talking about our new tariff. I do not believe France will meet our 25 per cent rate, but England probably will. The French apparently feel that they cannot hope to sell many cars in America and that if they cut their tariff to meet ours they will be opening the doors to a competition which will be formidable. In England they admit they cannot compete with the United States and they apparently welcome our cars. American cars, even with the duty, undersell those of English manufacture.

I believe the export situation is most favorable to us, and we ought to do a big business in England, Spain, the Scandinavian countries, Roumania and Greece. France, however, does not look so good, for there they go in strong for individuality and will pay good prices for French cars that meet their ideas. In England, to the contrary, while they have somewhat similar individuality in ideas, the matter of price figures.

None of the European countries are looking to the United States as a place to sell their cars. They are concentrating on South American business.

Germany is selling its cars in its own country, Russia and South America and trading in American dollars. Benz and Mercedes are each making about 4000 cars a year. Opel is building a few. Prices are holding up, too. No American cars are coming in.

Naturally, I am a great believer in racing. I feel that racing would re-stabilize our industry abroad, for our engines are not economical enough now for the foreigners. Racing would develop this economy.

Kelly Tire Increases Lists; Akron "Waits"

Makers, However, Predict Higher
Prices Will Come Within
Next 30 Days

NEW YORK, Dec. 4—Announcement is made of a 10 per cent horizontal increase in the price of casings, tubes and truck tires by the Kelly-Springfield Tire Co. This applies only to dealers' orders placed in December. Increasing prices of rubber and cotton are said to be the reason for the increase.

Makers Wait for Each Other

AKRON, Dec. 4—Practically every tire manufacturer in the Akron district is frank to admit that tire price increases are entirely logical and almost certain to come within the next 30 days. None apparently, however, is ready to initiate the movement, each manufacturer waiting for the lead to come from his competitor.

The 10 per cent increase announced by the Kelly-Springfield company was not close enough at home to cause Akron manufacturers to fall into line. It will take an announcement by one of the major companies here to start the upward revision of prices, and when that initial announcement comes a grand rush may be expected.

A survey of Akron manufacturers shows that practically all of them hold the opinion that prices should be raised. They cite the fact that the price of crude rubber has increased more than 10 cents a pound in the last 30 days because of the Dutch-English agreement to curtail production. This agreement followed the passage of the British Stevenson law whereby an export tax is laid on all crude rubber exported, with graduation upward as the amount of crude rubber produced increases.

At the same time the increase in the price of cotton fabric for tires is cited as making a tire price increase logical. And, in addition to these, has been a gradual increase in the cost of labor, all three factors having cut the tire manufacturer's margin of profit to a minimum.

Present tire prices average about 40 per cent below the peak prices charged for automobile tires while they are from 10 to 15 per cent below pre-war prices when tires did not give more than half the mileage guaranteed for the tire today.

Tire production now is averaging more than 90,000 a day in Akron. By next April or May, manufacturers say, tire production in all probability will rise to new marks and may approach 125,000 tires a day in the Akron district alone.

British Accept Invitation

NEW YORK, Dec. 4—The Rubber Growers' Association of London will send a committee to this country shortly after the holidays for a conference with

the special committee appointed by the Rubber Association of America to consider the new British restriction act limiting the production of crude rubber.

When this act went into force Nov. 1 the American association cabled to London asking for an international conference on the subject, fearing the effects of restricted production on the American tire industry. The British association suggested waiting until both sides had had an opportunity to see how the new idea would work out before conferring on the subject. Both now are agreed, evidently, that it would be best to get together as soon as possible.

It is acknowledged that the restriction act is the main reason for the price of crude rubber soaring to 27 cents, where it is today. It was quoted as low as 10 cents once within the past year, and most of the present tire prices were made when it was selling at from 15 to 17 cents. Since Nov. 1, however, there has been a gradual increase to the present level.

Americans fear that this restriction act may attract the speculators, and it is pointed out that a speculative rubber market would greatly hamper the industry in this country.

Goodrich Tubes Increased

AKRON, Dec. 7—The B. F. Goodrich Rubber Co. announces a 15 per cent increase in the price of its Silvertown tubes; 10 per cent, small size gray tubes, and 5 per cent in the price of its large size gray tubes. Tire prices remain unchanged.

December Is Opening With Big Production

(Continued from page 1145)

of about 30 daily is sold through the winter. Wills Sainte Claire, despite its temporary financial difficulties, is operating at the rate of about 20 cars daily.

Oldsmobile and Oakland are continuing operations at the rate of about 100 a day. Paige-Jewett schedules call for production of about 100 daily. Reo is approximating 100 a day in cars and speed wagons. Rickenbacker is building about 20 cars daily, and Durant about 100 daily each in both Durant and Star models. Gray is producing 100 daily and will increase this steadily to more than 200 daily by the first of the year.

Earl Motors, under the change in control, is outlining an extensive production for 1923 and is gradually increasing operations. Columbia has outlined a schedule of about 28,000 for 1923, on which it is now beginning. Liberty is arranging for its 1923 output and is operating on a regular winter schedule. Saxon is out of production pending completion of its financing.

Nash and Velie Output

CHICAGO, Dec. 4—Nash Motors at Kenosha, Wis., is now running on a schedule of about 170 fours and sixes a day, Velie Motors at Moline is running on a daily schedule of about 30 cars, production being somewhat restricted because of the scarcity of closed bodies.

Creditors of Saxon Seek Receivership

Officer of Company Says Failure
of Financial Plan Precipitated
Action

DETROIT, Dec. 6—Naming of a receiver for the Saxon Motor Car Co. has been asked in the Federal Court here pending action on a bankruptcy petition filed by three small creditors of the company. In the petition it is declared that the company has not been in operation for some time and that the plant at Ypsilanti has been left without any responsible person in charge. The petitioners are the Wire Wheel Corp., Detroit Insurance Agency and the Publicker Commercial Alcohol Co., whose claims aggregate \$3,400.

An officer of the company said that the action of creditors was not unexpected in view of the failure of the financial plans of the company. Stockholders authorized 200,000 additional shares of stock on Aug. 3 last and arrangements were made for their sale. These would have placed the company in a position to continue manufacturing, but market conditions made the quick sale of the securities impossible.

Planned to Build New Models

With the additional money, the company had planned to exhibit new models at the national shows this winter and to develop its business for 1923 on the new cars. These were 6-cylinder models to sell at about \$1,000 and had been fully developed. Failure of the sale of the stock made it impossible for the company to continue with its plans and the plant at Ypsilanti had been closed completely for upward of several months.

Since the retirement of Clarence A. Pfeffer as president last winter, Harry L. Bill, vice-president, had been in charge. The company has been reorganized several times and its stock is largely held by creditors under former regimes. The company relinquished its Detroit plant this year and moved to Ypsilanti as part of a retrenchment policy, but never has got into operation there.

Ford Factory at Trieste Is Included in Free Zone

WASHINGTON, Dec. 5—The Automotive Division of the Department of Commerce has received word of the granting of a concession to the Ford Motor Co. for the establishment of an assembling plant in the free zone of Trieste. When the question first came up the Ford company asked for the privileges of the free zone being extended to a plant lying outside these limits, which the company was desirous of acquiring. This request has been denied and an understanding reached whereby the plant will be located within the limits of the free zone.

Handley Reorganized and Takes New Name

Company Succeeding It Pays 40,-
628 Shares No Par Value
Stock for Assets

KALAMAZOO, MICH., Dec. 4—Handley Motors, Inc., with an authorized capital of 600,000 shares of no par value stock and \$1,000,000 preferred stock, par value of \$10 a share, has been organized and has taken over all the assets, including cash on hand, inventories, receivables and plant of the Handley-Knight Co.

The incorporators of the new company are: James I. Handley, W. E. Upjohn, Charles A. Blaney, C. S. Campbell, W. H. Conklin, R. J. Fitness and C. V. Kean, Jr. Directors named for the time being are Handley, Blaney, Conklin, Fitness and Kean. Handley is president and treasurer, and Blaney vice-president and secretary temporarily. This is announced as a tentative organization only and in order to get the new corporation into operative form. A permanent board of directors and officers will be elected later.

Car to Have 6-Cylinder Engine

Future plans of Handley Motors, Inc., provide for the manufacture of the same Handley-Knight de luxe chassis, with a 6-cylinder engine, instead of the 4-cylinder heretofore used, and a smaller 6-cylinder car now being developed. The development of the new smaller car is well advanced, and it will be ready to show, in connection with the larger car, at the National automobile shows, in New York and Chicago.

Details of the reorganization and transfer are given by Handley as follows:

The purchase price of the assets taken over from the old company was 40,628 shares of the new company's no par value stock, and the assumption by the new company of approximately \$170,000 of the old company's indebtedness, this consisting mainly of outstanding bonds on the real estate and buildings and bank lines secured by the unsold portion of the bond issue.

The 40,628 shares of stock are being taken by merchandise creditors of the old company on a basis of \$10 per share. By mutual agreement, and at my earnest solicitation, the material manufacturers' taking the 40,628 shares on the basis of \$10 a share will permit the sale of 109,372 shares of the same kind of stock at \$2.50 per share, and the old Handley-Knight stockholders are to have prior right of subscription to all this stock.

Old Stockholders Benefited

This arrangement is for the express purpose of giving the old Handley-Knight company stockholders, 764 in number, the opportunity of acquiring stock of the new company at an inside price, low enough to wipe out their loss in the old company.

When the 150,000 shares of stock have been fully issued as above outlined, outstanding stock will have a book value of approximately \$5 a share, exclusive of any good will items, and the old Handley-Knight stockholder who invests the same amount of

money in the new company that he had invested in the old company, will own new stock worth what it costs him, including his old investment.

Handley further explained that this initial financing will all be done privately by the company, and the issuance of this amount of stock, in accordance with the foregoing plans will give the new company all the liquid working capital it will need for its operations during 1923. In case the 109,372 shares are not taken by the old Handley-Knight stockholders, right is reserved to sell the remainder to outsiders at the same price, \$2.50 a share.

Handley further says:

After all this initial financing has been finished and the new company's manufacturing program is in operation, connections will be made with stock and bond houses throughout the country for the distribution of additional blocks of the authorized capital stock at higher prices, to supply additional working capital for the increased production for 1924 and thereafter.

The plant, except the service department and general repair work, has not been in operation for the past two months. The bulk of materials on hand and material commitments made in 1920 have been exhausted by the completed production program. It is the opinion of Handley that the new company, not being committed to any of the old high priced material contracts, will be in position to take advantage of present market levels right from the start, and, therefore, expects to be able to market the large car at about \$1,000 less than the former price. The smaller new six is expected to sell in the \$1,250 price field.

Elcar Awarded Contract to Build for Diamond Cab

ELKHART, IND., Dec. 6—Contracts have been signed by the Elcar Motor Co. of this city and the Diamond Taxicab Co. of New York City, under which the local concern will build the vehicles which will be operated by the New York organization. The Diamond company's initial order is for 1000 taxicabs of the landaulet type, and it is expected that the first shipment of five carloads will go East within a week.

The cab is the creation of A. M. Grafis, Elcar engineer, the feature of which is an adjustable top, which can be quickly lowered without interfering with protection from wind and dust from any angle.

Lorraine in Bankruptcy With \$82,322 as Debts

DETROIT, Dec. 5—Lorraine Motors Co. has filed a voluntary petition in bankruptcy, showing assets in excess of \$90,000 against debts of \$82,322. The petition is filed by J. L. Dornbos, secretary and treasurer, and lists the assets as \$52,000 in real estate, \$11,579 in bills, promissory notes, etc., \$19,025 in tools and machinery and accounts due, \$8,372. The debts are practically all unsecured claims with about \$5,000 due on taxes.

Inventory of Wills to Start Next Week

Intention of Receiver to Resume
Major Operations at Plant
First of Year

DETROIT, Dec. 6—Work of appraising the plant and properties of C. H. Wills & Co. will be started next week and will be completed, if possible, by Dec. 20. James G. Heaslet, Clarence A. Pfeffer and Robert H. Gordon have been named as appraisers of the Wills plant, to work under the direction of the Security Trust Co., the receiver.

The first two are well known in the industry as former heads of manufacturing companies. Gordon is a resident of Marysville, the site of the Wills plant, and has been selected for his special knowledge of the property.

Manufacturing operations at the plant have been discontinued for the present except for the work of completing cars in process of manufacture. It is the intention of the receiver to resume major operations the first of the year.

Hope for End of Receivership

Cars now on hand and in process of construction will be ample to meet sales requirements for the present, the receiver said to-day. It is hoped to bring the receivership to a speedy termination and a sale will be held soon after the first of the year. In the meantime the business will be operated on a sales basis and all orders from dealers will be filled without delay.

C. Harold Wills, John R. Lee and other officers of the company are working with the receiver in completing details for the appraisal and sale. Wills said the company would continue operations conservatively pending the termination of the receivership. Following the appraisal, he said, a statement would be made in which the company would outline its position and plans.

November Production May Aggregate 220,000

(Continued from page 1144)

while fewer cars are being sent by boat, that factor in transportation is still important.

All branches of the industry show a healthy condition. Trucks are meeting with better demand and plants are reporting increased operations. Tire makers are now working on improving their finished inventory situation to forestall any possible shortage. In the parts branch, manufacture is progressing with much less shrinkage than had been expected and shipments are being made on practically the same basis as in the past. Collections show an improvement over last month.

Complete Model Seen as Feature in 1923

This View Based on Replies to
Questionnaire Sent Out by
M. A. M. A.

NEW YORK, Dec. 5—Forecasting the trend in motor vehicles that will be exhibited at the national shows next month, based on the opinions of leading parts manufacturers who are contributing to its annual symposium, the Motor and Accessory Manufacturers Association declares that the dominant feature of 1923 will be the complete vehicle, not only of passenger cars but also of motor trucks.

There will be many other features stressed at the shows, such as the continued swing toward greater production of light sixes, the preponderance of closed cars, the emphasis on sport models, further emphasis on lightweight construction, a tendency to lower the cars to secure a racy appearance and an effort in the direction of simplification of design and greater engine efficiency, but out-ranking all these will be the trend toward making motor cars genuinely complete and ready for use in every detail.

"Extras" Part of Equipment

More and more appointments and devices which in the past have been regarded as extras are being adopted as standard equipment by vehicle manufacturers, declares the M. A. M. A. This does not mean the widespread standard installation of all accessories, but it does indicate that items that are indubitably useful and economical are being added in increasing numbers to the original equipment list.

Interpreting this development, M. L. Heminway, general manager of the M. A. M. A., says:

Instead of bringing about indiscriminate use of accessories, this trend will put the car equipment manufacturers to the test; only those accessories that are really useful and sound will meet the rigid requirements imposed by the engineers and executives of the vehicle builders, who in turn must be open minded and constantly responsive to the dictates and needs of a public desiring more complete, more efficient and more economical vehicles.

Progress in Body Design

Special progress will be evidenced in body design and construction. This will apply not only to the more obvious elements, but to the small details, such as door handles, windows and other appointments making for easier riding and better ventilation.

A sharp upward swing in the standard equipment listing of shock absorbers and bumpers is typical of the current practice of the car builders.

Alfred Reeves, general manager of the N. A. C. C., says in a letter:

After the automobile shows there will undoubtedly be a big campaign on closed bodies of various types, low priced and high priced. It is undoubtedly the car of the future. I

doubt whether there will be very many mechanical changes in chassis except the possible tendency of a few more of the four cylinder car makers getting into the six cylinder field.

Detailed analysis of the changes in construction and design is offered by H. L. Horning, general manager of the Waukesha Motor Co., Waukesha, Wis., and a director of the M. A. M. A.:

New truck designs will show greater engine efficiencies, more miles per gallon of both gasoline and lubricating oil, higher speeds and lower upkeep charges. On both trucks and passenger cars there will be shown decidedly better designs which have for their object more efficient vaporization of present fuels, less dilution troubles, smoother running of engines and more consistent performance in all details. All cars will be clean in lines and there will be a tendency to lower the cars by decreasing the height of the frame from the ground and also the tops, thus giving the racy appearance for cars of wheel bases of 110 in. or less.

Lower tops will be carried down to such an extent as to cause a very small clearance between the driver's head and the top. Better finish will be general and the general lines will be smoothed out and cars will be improved in usefulness by supplying more convenient means for carrying luggage of all kinds. There will be a number of new body models, especially useful for traveling men and general business use.

G. Brewer Griffin, manager of the automotive equipment department of Westinghouse Electric & Manufacturing Co., looks forward to "more efficient engines, better gears, synchronizing transmission gear-shifting devices and probably 'closed bodies' will appear of the 'knock down, removable upholstery' type."

Harsher Treatment Given Now to Reckless Drivers

NEW YORK, Dec. 4—Law enforcement officials throughout the country are making determined efforts to reduce the number of automobile accidents by compelling motorists to drive carefully. A judge in Detroit brought the lesson home by forcing drivers who had caused accidents to visit one of the hospitals and look at children who had been maimed by automobiles.

Mayor Shank in Indianapolis has ordered that hereafter all motorists arrested for violating the speed ordinance shall be taken to jail in patrol wagons and each compelled to give a \$5,000 bond.

Los Angeles is sending motorists to jail for 10 days. One of those to suffer such imprisonment is Ralph De Palma, who is now serving a 10-day sentence for speeding. The judge permitted De Palma to drive in the race at Los Angeles before going to jail.

CHEVROLET IN PHILADELPHIA

DETROIT, Dec. 4—Chevrolet Motor Co. has opened a new wholesale office in Philadelphia for the general supervision of wholesale business in that territory. The office will be in charge of Harry L. Porton, sales manager, and will cover eastern Pennsylvania, most of New Jersey and all of Delaware.

Stock Dividend Due Studebaker Holders

Directors Order 25 Per Cent Dis-
bursement—150,000 New
Shares Created

NEW YORK, Dec. 5—A special meeting of directors of the Studebaker Corp. held here to-day ordered a stock dividend of 25 per cent to common stockholders, payable Dec. 29 to holders of record as of Dec. 16. No action by stockholders is necessary, as the corporation has authorized common capital of \$75,000,000, of which only \$60,000,000 is outstanding.

The directors said: "The earnings of the corporation and its prospects are such that the management believes the present rate of 10 per cent dividends on the common stock will be continued on the new capitalization."

The directors also voted to transfer \$15,000,000 of the company's accumulated earnings, which have been permanently invested in plants, equipment, inventories, etc., from surplus to capital account to provide for the continually expanding business of the corporation. Certificates for the 150,000 shares of new common stock created by the distribution will be ready Dec. 29.

This is the second stock dividend paid by Studebaker. The first one of 33 1/4 per cent was paid May 5, 1920, when the common capital was increased from \$45,000,000 to \$60,000,000 by the transfer of \$15,000,000 from surplus to capital.

Reporting on the business for the first nine months of 1922, President A. R. Erskine states that net sales reached \$108,488,756 against \$80,593,998 a year ago, and that net profits totaled \$15,640,374 compared with \$9,644,326 in the same period last year. After provision for common and preferred dividends, there was carried to surplus \$10,631,999, against \$5,979,826 in 1921. Profit and loss surplus on Sept. 30 last aggregated approximately \$24,861,743, as compared with \$14,229,744 on Dec. 31, 1921.

Hydro Tire Stockholders Discuss Company's Future

POTTSTOWN, PA., Dec. 4—Representing 400,000 of the 520,000 shares, more than 200 stockholders of the Hydro United Tire Co., which is in the hands of receivers, met here to discuss plans to save the company. Two plans were submitted to obtain funds to meet all the expenses of the company, but no definite action was taken. Charles A. O'Neil refused to surrender the chair to a chairman appointed by the stockholders and also refused to resign as a director.

One plan is to raise \$700,000 by assessing the stockholders in order to lift the receivership and another is to raise \$500,000 immediately to put the company on its feet on condition that the old board of directors resign immediately.

New Jersey Highway Plan May Be Model

Provides That All Taxpayers Build Roads and Motorists Maintain Them

NEWARK, N. J., Dec. 5—That the "New Jersey Plan" is likely to become basic in highway financing in a majority of States was brought out to-night at a dinner given at the Robert Treat Hotel by the Good Roads Association of New Jersey in celebration of the endorsement at the last general election of the \$40,000,000 good roads bond issue, designed to finance the completion of the State highway system within the next five years.

This claim for national recognition of the importance of the plan was accentuated by the presence of Alfred Reeves, general manager of the National Automobile Chamber of Commerce, as the principal speaker. Reeves made it plain that the rest of the country is greatly interested in what promises to be a model law.

Reeves Approves Plan

"The plan is beyond question the soundest and most suitable method of raising the money necessary to build and maintain modern improved highways that I know of," declares Reeves.

Describing the "New Jersey Plan" briefly, it may be said that it calls on taxpayers as a whole to make the capital investment to build and reconstruct the highways, after which the motorists, by paying special registration fees, will maintain them. New Jersey is the first State to attempt anything of the sort, it being the common practice in States that have issued bonds to pay for road improvements to make the motorists not only pay for the maintenance, but also contribute largely to building and rebuilding them. Under the new law, therefore, the \$40,000,000 necessary to complete New Jersey's 730-mile State road system will come from general taxation. After this has been done, the motorists' fees will maintain the highways.

State Worked Under Old System

New Jersey has been working under a plan which called for the raising of funds by the imposition of a one mill tax on each dollar of State valuations of real and personal property, which brought in only about \$3,000,000 a year. That this was not feasible is shown by the fact that in 1922 alone it cost \$2,250,000 to maintain the roads, let alone build any. It is figured that under the new plan this maintenance can be handled at an expense of only \$500,000 and, further, the whole system will be completed within five years.

Continuing his remarks on the New Jersey Plan, Reeves said:

This policy of yours makes possible the logical and legitimate development to which

motor vehicle transportation is entitled. You have very wisely divided your highway financing activities into its two broad general phases—highway construction and highway maintenance.

Then, on the theory that highway improvement is of supreme importance to society as a whole, you levy general taxation upon all classes of property to provide the money necessary to make the capital investment in the construction and reconstruction of modern improved roads and bridges; after the highways have been built, on the theory that the motor vehicle not only receives a particular and peculiar benefit from them, but also is responsible for the wear and tear and ultimate destruction of their surfaces, you place the cost of maintenance upon motor vehicle owners.

On the other hand, the policy which aims to impose upon motor vehicle use not only the cost of maintaining improved highways but also that of constructing and reconstructing them has a tendency to stifle and discourage the use of the most efficient means of transportation that man ever has known.

Durant Increases Output of Star Car at Lansing

DETROIT, Dec. 5—Field representatives of the Durant and Star car products of the Lansing plant of Durant Motor Co. of Michigan were notified of changes of distribution policy of the two models at a meeting this week. The changes were occasioned principally by the greater production of the Star and by the largely increased dealer representation in the territory served by the Lansing plant.

Production on Stars is now approximately 175 daily and will reach 300 soon after the first of the year. A schedule of 90,000 for 1923 has been set, and this will be supplemented by 96,000 to be built at the Flint plant, now under construction. Shipments to the Pacific Coast have been discontinued with the completion of the Oakland plant.

Deliveries of closed bodies, which have handicapped production up to this time, have reached proportions required by sales, and within two weeks the company expects to be on an even basis. Durant car business is reported slowed down from the early season rush, but maintaining a satisfactory volume.

Hoover Bumper Claim Sustained by Court

(Continued from page 1146)

character sufficiently broad for the broadest possible doctrine of equivalents. The fact remains that he was the first inventor of a practical spring-bar bumper having universal resilience in a horizontal plane, and, therefore, is entitled to a reasonably broad interpretation and application of equivalents.

The elements of its construction were use of spring steel throughout; secondly, the contour involving the transverse spring-bar spanning the vehicle and the peculiarly shaped end loops and their supports, and, thirdly, the use of the flat strips of spring material of much greater vertical dimensions that are horizontal when the strips are in place. Hoover was the first to combine all these things.

Assets of Republic Truck Show Excess

Amount to \$6,289,930, According to Receiver—Liabilities Total \$5,181,862

DETROIT, Dec. 5—According to the Security Trust Co. of this city, receiver for the Republic Motor Truck Co. of Alma, Mich., that concern showed assets of \$6,289,930 and liabilities of \$5,181,862 on Sept. 28. The receiver's report shows:

Assets: Property account, \$2,010,156; mortgages, \$31,111; invested in and advanced to subsidiaries, \$2,430,783; inventories, \$1,561,486; notes and accounts receivable, less reserve, \$29,788; liberty bonds pledged, \$14,000; cash, \$5,287; deposited with trustee, \$200,000, and deferred charges, \$7,329.

Liabilities: First mortgage, 7's, \$2,500,000; accrued interest to Sept. 28, \$94,722; mortgages on Cleveland property, \$91,162; accrued interest on same, \$1,597; bank loans, \$144,764; accrued interest, \$1,021; accrued local taxes, \$74,164; provision for Federal taxes, \$130,000; accrued excise, etc., taxes, \$927; accrued payrolls, \$15,063; unsecured current liabilities, \$2,078,412; reserve for contingencies, \$50,000.

The excess of tangible assets over liabilities, exclusive of capital, is \$1,108,068.

Property Account

The property account is explained as follows: Land, buildings, machinery and equipment, etc., at depreciated values; factory land at Alma, \$108,248; land not used for manufacturing purposes at Cleveland, \$234,420; buildings and equipment, \$1,146,454; machinery and equipment, \$325,950; tools, dies and patterns, \$116,825; motor trucks in service, \$23,948; office furniture and fixtures, \$54,311.

Town Takes Detroit Name in Preparation for Plant

WINCHESTER, VA., Dec. 4—Mystery continues to envelop the principals in the reported deal to construct a \$10,000,000 automobile plant at Ridgeway, nine miles from here. Ernest L. Luttrell of Martinsburg, the attorney who is said to represent the financial interests, still refuses to mention names, but a contract has been let for laying out the town site, consisting of 2500 acres, which will be the home of the factory workmen.

About the only development that has been announced is that the name of the town is to be changed from Ridgeway to Detroit, W. Va.

Denial is made that the affair is a scheme to sell land, and Luttrell declares that those interested have nothing to offer for sale in the way of stock, bonds or lots. Among the persons mentioned in the transactions are Harvey S. Firestone and Henry Ford, but there seems to be no evidence that either of them is interested, although local reports say that all the deeds for the land are being made out in Firestone's name.

Tire Report Shows Increase in Output

Inventories and Shipments Also Gain in October Over Previ- ous Month

NEW YORK, Dec. 5—October showed an increase in production of casings, tubes and tires over the previous month and a marked gain over October of last year, according to figures compiled by the Rubber Association of America, Inc., for the Department of Commerce.

An increase is also noted in inventories and shipments.

A comparative table of inventory, production and shipments is as follows:

PNEUMATIC CASINGS

	No. Mfrs.	Inven- tory	Produc- tion	Ship- ments
1921—	Reporting			
Jan. ...	45	5,319,605	703,430	965,417
Feb. ...	45	5,193,018	819,892	1,073,756
Mar. ...	46	4,597,103	1,163,314	1,614,651
April ...	49	4,527,445	1,651,418	1,785,951
May ...	59	4,451,668	2,100,917	2,085,882
June ...	63	4,154,456	2,313,265	2,643,850
July ...	63	3,892,037	2,570,524	2,757,581
Aug. ...	66	3,934,853	3,043,187	2,894,442
Sept. ...	63	3,340,798	1,929,268	2,047,929
Oct. ...	64	3,545,030	1,928,271	1,675,169

1922—				
Jan. ...	66	4,174,216	2,055,134	1,596,806
Feb. ...	66	4,691,329	2,084,308	1,562,365
Mar. ...	63	5,183,286	2,645,790	2,073,963
April ...	65	5,464,336	2,401,187	2,086,651
May ...	65	5,523,095	2,721,503	2,639,273
June ...	64	5,042,147	2,838,890	3,133,260
July ...	63	4,834,106	2,476,636	2,695,095
Aug. ...	63	4,629,392	2,905,209	3,029,823
Sept. ...	64	4,612,037	2,504,744	2,502,106
Oct. ...	64	4,682,958	2,674,662	2,583,770

INNER TUBES

	No. Mfrs.	Inven- tory	Produc- tion	Ship- ments
1921—	Reporting			
Jan. ...	47	5,586,163	740,824	1,042,617
Feb. ...	46	5,415,464	916,627	1,129,881
Mar. ...	48	5,044,861	1,346,483	1,643,690
April ...	51	4,916,772	1,762,122	1,983,571
May ...	57	4,751,880	2,210,040	2,342,567
June ...	60	3,835,098	2,359,928	3,232,673
July ...	61	3,122,815	3,020,981	3,603,248
Aug. ...	64	3,649,319	4,430,152	3,804,060
Sept. ...	62	3,827,830	3,274,822	2,645,758
Oct. ...	64	4,732,016	2,843,918	2,016,371

1922—				
Jan. ...	66	5,246,647	2,343,393	1,889,724
Feb. ...	65	6,141,956	2,596,774	1,702,583
Mar. ...	63	6,991,118	3,017,511	2,090,737
April ...	65	7,230,096	2,650,573	2,329,343
May ...	65	7,189,552	2,970,696	2,938,947
June ...	64	6,186,534	3,130,629	3,973,679
July ...	63	5,675,839	3,068,199	3,630,744
Aug. ...	63	5,207,228	3,808,224	4,220,055
Sept. ...	64	5,164,757	3,501,442	3,558,971
Oct. ...	64	5,488,033	3,787,758	3,420,680

SOLID TIRES

	No. Mfrs.	Inven- tory	Produc- tion	Ship- ments
1921—	Reporting			
Jan. ...	12	303,753	21,220	29,116
Feb. ...	12	304,374	23,365	29,599
Mar. ...	12	283,800	28,710	43,926
April ...	12	269,985	28,859	42,080
May ...	12	264,663	35,156	40,122
June ...	11	240,336	28,395	49,867
July ...	11	220,003	35,123	55,678
Aug. ...	11	216,367	55,694	66,866
Sept. ...	11	161,832	37,441	50,276
Oct. ...	10	163,299	46,274	45,911

1922—				
Jan. ...	11	181,769	40,224	33,294
Feb. ...	11	183,448	39,492	36,505
Mar. ...	11	182,197	49,433	48,350
April ...	11	173,748	46,664	52,309
May ...	11	170,904	57,640	60,711
June ...	11	169,808	66,089	63,408
July ...	11	176,375	71,505	60,425
Aug. ...	11	189,698	84,312	69,435
Sept. ...	11	200,016	82,767	66,797
Oct. ...	11	213,942	85,480	71,275

"Production" and "Shipment" figures cover the entire month for which each report is made. "Inventory" is reported as of the last day of each month.

"Inventory" includes tires and tubes constituting domestic stock in factory and in transit to, or at, warehouses, branches (if any), or in possession of dealers on consignment basis, and as a total represents all tires and tubes still owned by manufacturers as a domestic stock.

"Shipments" includes only stock forwarded to a purchaser and does not include stock forwarded to a warehouse, branch or on a consignment basis.

FINANCIAL NOTES

Stromberg Carburetor Co. has declared a quarterly dividend of \$1.25 a share payable Jan. 2 to stock of record Dec. 14. This increases the annual dividend rate from \$4 to \$5. For nine months ended Sept. 30, 1922, the company shows net profit of \$378,716 after expenses and taxes; equivalent to \$5.05 a share earned on outstanding 75,000 shares of no par value capital stock. This compares with \$126,091, or \$1.68 a share in the corresponding period of 1921. For the quarter ended Sept. 30, 1922, net profit was \$156,121, compared with \$74,547 in the third quarter of 1921. Consolidated balance sheet as of Sept. 30, 1922, shows notes and accounts receivable of \$437,425, as against \$303,901 in 1921, and accounts payable and accrued accounts of \$146,412, compared with \$32,015 in the previous year.

Nash Motors Co. has increased its stock by \$22,600,000 preferred and 245,000 shares of common. The outstanding preferred stock of the company at present is \$3,314,900. Of the authorized common stock of 55,000 shares 54,600 are outstanding. The present preferred stock outstanding, which is 7 per cent cumulative, has been called for payment on Feb. 1, 1923.

Ford Motor Co. has declared the regular semi-annual dividend of 3 per cent and an extra dividend of 3 per cent on the profit-sharing investment certificates to employees. This makes a total of 12 per cent for the year.

Kelly-Springfield Tire Co. has declared the regular quarterly dividend of 1½ per cent on the 6 per cent preferred stock, payable Jan. 2 to holders of record Dec. 15.

Hood Rubber Co. has declared the regular quarterly dividend of \$1 per share on the common stock, payable Dec. 30 to holders of record Dec. 20.

Kelsey Wheel Co. declared a usual quarterly dividend of \$1.50 a share on common stock, payable Jan. 2 to stock of record Dec. 20.

Motor Wheel Corp. has declared the regular quarterly dividend of 2 per cent on common stock, payable Dec. 20 to stock of record Dec. 12.

Hoover Steel Ball Co. has declared a dividend of 2 per cent on the common stock, payable Dec. 22 to stock of record Dec. 15.

SYRACUSE RUBBER CO.

In the issue of AUTOMOTIVE INDUSTRIES of Nov. 16 it was stated that the liabilities of the Syracuse Rubber Co., Inc., manufacturers of Syra-Cord tires, were \$450,000, with assets of \$360,000. This was due to a typographical error, and the statement should have read "with assets above liabilities of \$360,000."

BANK CREDITS

Written exclusively for AUTOMOTIVE INDUSTRIES by the Guaranty Trust Co., second largest bank in America.

Loans on call last week covered a range of 4 per cent to 5½ per cent, as in the previous week. Increased firmness developed toward the end of the week, which was due, doubtless, to end-of-month settlements. In time money, smaller offerings were noted and the quotations remained the same as in the preceding week, 5 per cent for all maturities from 60 days to 6 months. Prime commercial rates continued to be quoted at 4½ per cent to 4¾ per cent.

On Dec. 4 the cable rate for sterling exchange rose to \$4.54. This is the highest point since 1919, when market support was removed from the pegged quotation of \$4.76½. The latest available statistics show that England's excess of merchandise imports over exports had been considerably reduced, and this is doubtless a factor in the advance of sterling.

Corporate financing during the month of November, including bond, note and stock issues, amounted to \$217,713,750, which was a decrease of \$38,224,050 from the total for November, 1921, but an increase of \$47,131,350 over the total for October, 1922. For the first 11 months of 1922, total corporate borrowings amounted to \$2,991,540,470, as compared with \$2,316,533,800 for the corresponding months of 1921.

For the week ending Nov. 18, the total coal output was 13,404,000 tons, of which 11,213,000 tons were bituminous and 2,191,000 anthracite. The preliminary returns indicate a total of 11,000,000 tons of bituminous coal produced during the week ended Nov. 25. Both anthracite and bituminous production are now at a high level. The total production for this year up to date shows a decrease of 4.6 per cent in bituminous and 48.4 per cent in anthracite production, as compared with the corresponding period a year ago.

The Federal Reserve statement as of Nov. 29 showed a decrease of \$10,467,000 in gold reserves and \$10,873,000 in total reserves. Bills on hand increased \$37,726,000, and total earning assets \$47,065,000. Total deposits declined \$29,765,000, while Federal Reserve notes in circulation increased \$30,423,000.

Willys-Overland Takes Annual Inventory Early

TOLEDO, Dec. 3—The Willys-Overland Co. to-day finished its annual inventory-taking period, which had been moved up several weeks to enable the plant to get started on its 1923 program.

At the time of the inventory 5925 men were at work at the local plant.

From the early commitments of branches and dealers for both automobiles and parts, it is indicated that 1923 will undoubtedly top the successful present year for production at the Toledo plant.

South Is Offering Good Sales Market

Bank Reports Show Improvement There—Résumé Outlines Opportunities

(Continued from page 1150)

prices means prosperity in itself for this county, outside of the large textile operations at Huntsville.

The coal mines of Alabama have been greatly hampered in their operations during the past two months owing to the shortage of cars, and particularly since the removal of the priority order for coal. This condition is causing slack trading to a measure in the areas covered by the mines, especially in parts of Jefferson and Walker counties. The general improvement in other lines is taking care of this slump, however, and it is thought that as cars become available the mines will return to full time.

Territories With Prospects

From an automotive merchandising point of view the conditions outlined above show excellent markets in the territories of Birmingham (in spite of the slackening coal mining), Memphis, Little Rock, Montgomery, Mobile, Chattanooga, New Orleans, Clarksdale, and Huntsville.

The Memphis territory is worthy probably of first note. In this territory the Arkansas portion is in good shape, the Mississippi Delta portion is showing wonderful gains in bank deposits (this section includes Clarksdale, Mississippi), and the Tennessee and northeast Mississippi sections (the latter including Tupelo), are showing steady improvement in purchasing power.

The Montgomery and Mobile territories are affected by somewhat the same conditions, that is they both are feeling the effects of Alabama's excellent cotton crop that is being sold at a good price. Mobile, also, is getting some of the benefit from Mississippi's good crop, and the direct effect from the largest production of Satsuma oranges ever produced in the State of Alabama. Towns in the Montgomery territory worthy of note are Selma, Greenville, Prattville, and Demopolis, Alabama. Mobile serves Baldwin and Mobile counties, part of the Mississippi coast, and part of Florida as well as a large part of other counties lying to the north of it.

Little Rock Good Market

The prosperity of Little Rock and the section surrounding it is readily indicated by the large increase in Little Rock bank deposits. This will be a good market for automobiles undoubtedly during the balance of the winter months, and next spring when planting begins.

New Orleans, always a good market, should be considerably improved by the good crops surrounding it on all sides in cotton and the consequent liquidation

of many accounts and cotton held on storage.

Chattanooga reports the best conditions prevailing in their city that have obtained for several years. This city and the surrounding territory should be a good market for sales the balance of the winter months.

Huntsville has been coming into its own during the past few months with the large cotton crop produced in the immediate county and the excellent operation of the textile industry. This county and the entire Tennessee Valley should be a good market for automobiles this winter, and during the spring months.

Chalmers Is Acquired by Maxwell Noteholders

DETROIT, Dec. 7—The plant and properties of the Chalmers Motor Co. were sold at receiver's sale to-day to Boyd G. Curts, representing the Maxwell note holders' committee, for \$1,987,600. There were no other bidders. Bids for the property in separate parcels, also by Curts, were dismissed in favor of the bid for the whole property.

INDUSTRIAL NOTES

Twin Piston Ring Corp. will remove its plant from West Orange to larger quarters at 227-229 High Street, Newark, N. J. The new factory will be equipped with the most modern machinery and will be in production by Jan. 1. Preparations are being made for a much larger output. The corporation recently was reorganized by the election as president of Robert A. Bachman, formerly vice-president and general manager of the Thomas A. Edison Industries. The other officers are: Vice-president and engineer, A. W. Almquist; treasurer, Frank D. Reeve; secretary and assistant treasurer, F. B. Reeve, and assistant secretary, A. Horace Owen.

L. H. Gilmer Co., manufacturer of industrial webbing and belting, is erecting an addition to its plant at Tacony, Philadelphia. The new unit will afford 25,000 sq. ft. of warehouse space, equipped with the latest devices for handling freight, and a 6000 sq. ft. boiler plant. The boilers are for heating and process work only, as the plant is electrically powered from outside. The new building will be connected with the remainder of the plant on the second and third floors by enclosed bridges over the intervening streets, and served by a spur railroad track. It will be completed in March.

Chester A. Thompson, general manager of the Tire & Rim Association of America, Inc., has opened an office as manufacturers' agent in the Leader-News Building, Cleveland. He will represent Transue & Williams Steel Forging Corp., Alliance, Ohio, drop forgings and stampings and Boston Pressed Metal Co., Worcester, Mass., seamless drawn work.

Piston Ring Co. of Muskegon, Mich., is preparing to increase its output from 12,000 piston rings daily to 20,000 a day. This will be accomplished by a large addition to the company's foundry facilities.

Season's Last Race Gives Murphy Title

A. A. A. Declares Him Champion Driver of Year—Standing of Other Racers

NEW YORK, Dec. 4—Jimmy Murphy has been officially declared the champion driver of the year by the Contest Board of the American Automobile Association, following the running of the last of the 1922 championship events at Los Angeles yesterday. Murphy won the final race, although the victory was not needed to clinch the title.

Murphy captured the championship with a total of 3420 points, gathered in the 12 title races of the season, which included six firsts, three seconds and two thirds. His chief success was at Indianapolis. He also won at Fresno, Cotati, Uniontown, Tacoma and Kansas City. He is the fourth holder of the title, which had been awarded successively to Dario Resta, Gaston Chevrolet and Tommy Milton.

Captured French Grand Prix

Murphy has been in the limelight since last year, when he was sent to France by Albert Champion and, driving a Duesenberg, won the French Grand Prix, the first foreign victory ever achieved by an American in an American-built car. This year he drove a Murphy Special until yesterday when he piloted a Durant Special.

Twenty-four drivers in all were awarded points this season, according to the official table issued by Chairman Croselmire of the Contest Board. Murphy led the field ever since Indianapolis, with Tommy Milton runner-up. Milton won three races this year, but failure to get placed at Indianapolis set him back.

The final standing is as follows:

Driver	Total Points	Driver	Total Points
Murphy	3420	Thomas	124
Hilton	1910	Halbe	109
Hartz	1788	Fetterman	108
Elliott	875	Wilcox	50
Hill	459	De Paolo	43
Hearne	393	Alley	35
Wonderlich	375	Miller	25
Sarles	280	Vall	21
Cooper	260	Koetzla	19
Mulford	255	Shafer	17
Klein	229	Morton	15
De Palma	160	Melcher	5

Murphy Wins Final Race

The final race returned Murphy a victor in 2 hours, 10 minutes, 53.1 seconds for 250 miles, or 114.1 m.p.h. Earl Cooper, also in a Durant Special, just beat out Hartz and Hill in a brilliant finish. Ten cars started, of which six were officially finished as follows: Murphy, 2:10:53.10; Cooper, 2:12:13.41; Hartz, 2:12:14.45; Hill, 2:12:18.11; Milton, 2:14:22.92; Klein, 2:17:13.71. Thomas, De Paolo, Hearne and De Palma were placed as named.

Calendar

SHOWS

- Jan. 6-13—New York, National Automobile Show, Grand Central Palace, under auspices of National Automobile Chamber of Commerce.
- Jan. 8-13—New York, Second National Automobile Body Builders Show, Twelfth Regiment Armory, under the auspices of the Automobile Body Builders Association.
- Jan. 27-Feb. 3—Chicago, Annual Automobile Salon.
- Jan. 27-Feb. 3—Chicago, National Automobile Show, under auspices of National Automobile Chamber of Commerce, Coliseum and First Regiment Armory.

FOREIGN SHOWS

- Dec. 15-Jan. 2—Paris, Aeronautical Salon, Grand Palais. Chambre Syndicale des Industries Aeronautiques, 9 Rue Anatole de la Forge.
- Jan. 13-24—Brussels, Sixteenth International Automobile and Cycle Exposition, Palais du Conquenant.
- April-July, 1923—Gothenburg, Sweden, International Automobile Exhibition, Sponsored by the Royal Automobile Club of Sweden.

RACES

- May 10—Berlin—Grunewald, German Grand Prix.

CONVENTIONS

- Jan. 15-19—Chicago, Thirteenth American Good Roads Congress and Fourteenth National Good Roads Show.
- Jan. 29-31—Chicago, Annual Meeting, Automobile Electric Service Association, Congress Hotel.

S. A. E. MEETINGS

Metropolitan Section

- Dec. 14—Speaker, Charles P. Grimes, Research Engineer, H. H. Franklin Manufacturing Co.; Subject, Air Cooling in Automotive Engines.
- March 15—Speaker, William P. Kennedy, President, Kennedy Engineering Corp.;

Subject, Trolley Buses and Flexible Vehicles for Street Railway Service.

- April 19—Speaker, Edw. E. La Schum, General Superintendent, Motor Vehicle Equipment, American Railway Express Co.; Subject, Engineering Features of Fleet Operation.

- May 17—Speaker, F. P. Gilligan, Secretary, Henry Souther Engineering Co.; Subject, Metallic Materials for Automotive Work.

Other Meetings

- Jan. 9-12—New York, Annual Meeting.
- Jan. 31—Chicago Meeting and Dinner of the Society at the Congress Hotel.

Government to Make Few New Purchases

WASHINGTON, Dec. 5—The purchase of new automotive equipment by the various branches of the Federal Government is contemplated in but two departments, according to estimates in the budget submitted to Congress for the fiscal year of 1924.

The largest single item in the budget is \$150,000 for the Bureau of Indian Affairs. The budget committee recommends, however, that such equipment must be bought from the War Department if it is available. The Department of Agriculture is to be given \$132,249.

An appropriation of \$25,000 is asked by the Bureau of Standards to develop standards of quality of rubber and methods of measurement. A large part of the sum will be spent in the development of tires and for research in this field. A total appropriation of \$105,966,000 is recommended for road work, of which \$100,000,000 is for co-operative construction of rural post roads, representing an increase of \$5,000,000 over the estimated expenditure for the fiscal year of 1923 and \$9,000,000 over the sum actually expended in the fiscal year of 1922.

Distributors Shown New Model of Ruggles Truck

DETROIT, Dec. 4—Ruggles Motor Truck Co. showed a new $\frac{3}{4}$ -ton model at its distributor convention, on which it soon will be in production. The price on the model has not been definitely set, but it is announced that it will be low and that the truck is designed to meet the requirements of light delivery business. A total of 1420 of the new model was signed for at the convention.

With this truck the company will have three models in production, the others being the 1 to $1\frac{1}{4}$ -ton and the 2- $\frac{1}{2}$. On the first two models, the company has

manufactured 906 in its Saginaw plant during the year and 306 at its Canadian plant.

Gardner Model Is Powered with New Lycoming Engine

ST. LOUIS, Dec. 5—Announcement is made of a new Gardner model for 1923 which will be powered with the Lycoming four-cylinder engine, recently described in AUTOMOTIVE INDUSTRIES. The engine has a bore of 3 $\frac{11}{16}$ instead of 3 $\frac{1}{2}$ in. and will develop considerably more power than the old one, which is also of Lycoming make.

Other features of the new model include an improved carburetor, a 16-in., four-blade fan, with bronze bearing and thrust washer, a larger (10 in.) Borg & Beck clutch requiring a pedal pressure of only 25 lb. as against 45 lb. on the 1922 model, an emergency brake on the transmission, a spoon type emergency brake lever release, larger and improved service brakes, a heavier rear axle, an improved frame front cross member which makes the timing gears and forward end of engine readily accessible, a heavier frame, improved, anti-rattle hood catches, genuine leather seat ends in addition to leather cushions and backs, door pocket flaps with metal fillers and improved trimming around the doors.

The new model will be furnished in four body styles, roadster, \$965; phaeton, \$965; coupe, \$1,115, and sedan, \$1,345, representing an increase in price of \$70 on the open models and \$20 on the closed.

MONROE BODY REBUILDING

LUDINGTON, MICH., Dec. 5—The Monroe Body Co., burned out Nov. 15, is rebuilding on an enlarged scale. The Ludington city commission has authorized the purchase of a 500-acre strip of land, near the Pere Marquette Railroad for its use, and the company will also be financially assisted in the erection of its new plant.

S. A. E. Makes Ready for Winter Meeting

NEW YORK, Dec. 4—A tentative program has been prepared for the annual winter meeting of the Society of Automotive Engineers to be held in this city Jan. 9 to 12. A meeting of the Standards Committee will open the proceedings on Tuesday morning and will continue through the afternoon.

It is probable that body engineering sessions will be held on Tuesday and Wednesday. L. V. Pulsifer will present a paper on the testing of automobile paints and varnishes, with actual demonstrations. George J. Mercer will read a paper on the design and construction of less expensive closed bodies and F. F. Murray will give a paper on standardization of various lumber sizes and specifications.

Paper on Steering Gears

Wednesday morning will be given over to reports and a paper by Herbert Chase on "Steering and Steering Gears." The following papers will be presented in the afternoon: "Practical Method of Securing High Compression Without Detonation," by Prof. G. A. Young; "Fundamental Laws Governing Detonation," by Thomas Midgley, Jr.; and "Means of Measuring Detonation and Comparing Fuels for Use in High Compression Engines," by Stanwood W. Sparrow and S. M. Lee.

Thursday afternoon, Robert E. Wilson will read a paper on "Fuel Volatility" and C. S. Kegerreis will give one on "Carburetion of Gasoline and Kerosene." The Co-operative Fuel Research Session will be held Thursday morning.

On Friday morning, S. D. Heron will give a paper on "Air Cooling of Passenger Car Engines" which will carry appendices by C. F. Taylor and E. H. Dix, Jr. Prof. E. H. Lookwood will present data and empirical formulas on the "Cooling Capacity of Automobile Radiators."